ARMY CHEMICAL REVIEW

THE PROFESSIONAL BULLETIN
OF THE CHEMICAL CORPS

HEADQUARTERS, DEPARTMENT OF THE ARMY
Approved for public release; distribution is unlimited.
PB 3-04-1, April 2004

USACMLS/MANSCEN
573-XXX-XXXX/DSN 676-XXXX

COMMANDANT
COL (P) Stanley H. Lillie 563-8053
<lillies@wood.army.mil>

ASSISTANT COMMANDANT
COL Gary Wallace 563-8054
<wallaceg@wood.army.mil>

COMMAND SERGEANT MAJOR
CSM Peter Hiltner 563-8051
<hiltnerp@wood.army.mil>

3d CHEMICAL BRIGADE/DSN 581-XXXX
COL Don Bailey 596-0016
<baileydo@wood.army.mil>

82d CHEMICAL BATTALION
LTC John Kulifay 596-4835
<kulifayj@wood.army.mil>

84th CHEMICAL BATTALION
LTC Peggy Combs 596-2414
<combspe@wood.army.mil>

58th TRANSPORTATION BATTALION
LTC Eric Hazas 596-0991
<hazase@wood.army.mil>

USACMLS Directors

DOCTRINE, ORGANIZATION, TRAINING, MATERIEL, LEADERSHIP AND EDUCATION, PERSONNEL, AND FACILITIES
COL Robert Dalessandro 563-6652
<dalessandror@wood.army.mil>

CHEMICAL DEFENSE TRAINING FACILITY
LTC Daniel Murray 596-0608
<murrayd@wood.army.mil>

MANSCEN

DIRECTORATE of TRAINING DEVELOPMENT
Acting Director
Mr. Terry Tapp 563-4111
<tappt@wood.army.mil>

DIRECTORATE of COMBAT DEVELOPMENTS
Chemical Division Chief
LTC Lary Chinowsky 563-4078
<chinowskyl@wood.army.mil>

Managing Editor, Shirley Bridges 573-563-4104
<bridgess@wood.army.mil>
Editor, Kimberly Whitacre 573-596-0131, 35274
<whitacrk@wood.army.mil>
Graphic Designer, Kathryn M. Troxell 573-596-0131, 35267
<troxellk@wood.army.mil>

Front cover: Computer "painting" by Kathryn M. Troxell based on an original photograph by Sergeant Paul L. Anstine II, 1st Marine Division.

CML, Army Chemical Review is prepared twice a year by the U.S. Army Chemical School, Fort Leonard Wood, Missouri. *CML* presents professional information about Chemical Corps functions related to nuclear, biological, chemical, smoke, flame field expedients, and NBC reconnaissance in combat support. Objectives of *CML* are to inform, motivate, increase knowledge, improve performance, and provide a forum for exchange of ideas. This publication presents professional information, but the views expressed herein are those of the authors, not the Department of Defense or its elements. The content does not necessarily reflect the official U.S. Army position and does not change or supersede any information in other U.S. Army publications. Use of news items constitutes neither affirmation of their accuracy or product endorsement.

Articles may be reprinted if credit is given to *CML* and its authors. All photographs are official U.S. Army photos unless otherwise noted. *CML* reserves the right to edit material.

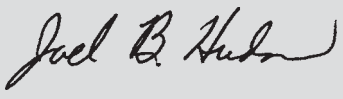
PERSONAL SUBSCRIPTIONS: Available through the Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954.

POSTMASTER: Send address changes to Army Chemical Review, 320 MANSCEN Loop, Suite 210, Fort Leonard Wood, Missouri 65473-8929.

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:



JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0331016

Back cover: Scenes from Operation Iraqi Freedom—*top,* soldiers erect a Chemical Biological Protective Shelter System (Photo, Staff Sergeant John Marlow, 982d Signal Company); *center left,* a soldier dons his gas mask during a drill (Photo, Lance Corporal Nathan Alan Heusdens, 1st Marine Division); *center right,* nuclear, biological, chemical equipment confiscated during a raid in Iraq (Photo, Sergeant Albert Eaddy, 55th Signal Company); *bottom,* a soldier uses an Improved Chemical Agent Monitor to check for chemical agents in a building in Iraq (Photo, Specialist Kathy Jo Young, 982d Signal Company).

ARMY CHEMICAL REVIEW

THE PROFESSIONAL BULLETIN OF THE CHEMICAL CORPS

PB 3-04-1
April 2004

Articles

8 **Department of Defense Response Capabilities for CBRNE Consequence Management**
By Professor James Kievit and Mr. John Auger

13 **The Dragon's Challenge**
By Captain Troy Paisley

15 **Romanians Get "Perfect 10" for Coalition NBC Performance**
By Staff Sergeant Thomas N. Orme

20 **Responding to Armageddon: The National Guard Bureau Weapons of Mass Destruction Civil Support Teams**
By Professor James Kievit and Mr. John Auger

23 **The Changing Face of Biological Warfare Defense**
By Mr. Al Mauroni

28 **The U.S. Army Chemical Corps—An Expansion in Skills and Equipment Is Needed to Support Response to TIM/HAZMAT Release Incidents**
By Major James Demyanovich

32 **Science and Technology in a Dynamic CBRN Landscape**
By Mr. Victor Ellis

34 **American Gas Masks for American Soldiers—Gas Mask Production in the World Wars**
By Lieutenant Colonel Robert D. Walk

38 **Ricin Toxin: A Military History**
By Mr. Reid Kirby

41 **"We Did Not Feel We Were Heroes" The 81st Chemical Mortar Battalion (Motorized) on Omaha Beach, 6 June 1944**
By Mr. Kip A. Lindberg

49 **Quality Assurance Feedback Program**

Departments

2 **Chief of Chemical**

3 **Regimental Command Sergeant Major**

4 **Soldier's Creed**

12 **U.S. Army Chemical School Web Site**

17 **Soldier Safety—Motorcycle Rider Risk Management**
By Mr. Fred E. Fanning

19 **Army Values**

22 **Letters to the Editor**

44 **Address Corrections Requested**

45 **Soldier Safety—Wearing Synthetic Fiber Underwear Under the Nomex® CVC Uniform**
By Mr. Larry T. Hasty

46 **Book Reviews**
By Mr. Reid Kirby

47 ***CML, Army Chemical Review* Writer's Guide**

48 **Subscription Page**

Moving Our Corps Into the 21st Century

COL(P) Stanley H. Lillie

This is my first opportunity to address the Corps in this venue; as such, I would like to express my heartfelt pride in assuming duties as the twenty-third Chief of the U.S. Army Chemical Corps. It has been a humbling experience for me to travel around the Army and visit with our Dragon Soldiers. I am always impressed by your ability to accomplish the mission, no matter what the task or circumstances may be. Keep up the great work protecting our Army!

It has been a very busy and challenging year for the Chemical Corps. Foremost on our list is the Global War on Terrorism, especially in Afghanistan and Iraq, which has tested our determination to combat terrorism around the world. Our moral fiber as a country, an Army, and a Corps has been tried, and I believe America stands proud as the leader of a free world.

This challenge to our way of life has confirmed the necessity of an organization tactically and technically proficient in chemical, biological, radiological, and nuclear (CBRN) defense. The Chemical Corps is that organization. Our focus must now be on how the Corps will meet the expanding and changing operational environment of the future while providing the Army a viable CBRN defense capability. We are rapidly evolving from the Cold War-oriented force protector to a 21st century responsive, assertive, and comprehensive Corps equally adaptive to warfighting and homeland defense.

The Chemical Corps is the Army's and the nation's leader in CBRN defense. As such, we have the responsibility to transform the Corps to meet the needs of our nation in this time of war and throughout the 21st century.

It is critical that I share my vision for the future of the Chemical Corps in this venue. The cornerstone of this vision is providing the Army the capability to operate and function completely unhindered by a threatened or real CBRN event and to operate unencumbered in the ensuing CBRN environment. This ability will allow the combatant commander to deploy and use his forces with impunity against our enemies.

To achieve this level of proficiency, we must provide our fighting forces the training, equipment, and expertise they require. The Chemical Corps provides the expertise with a professional group of CBRN defense experts, unsurpassed tactically and technically, and imbued with the Warrior Ethos. The soldiers who serve in our Corps must be highly qualified soldiers, able to adapt to any situation, in any operational environment.

"An Army superbly equipped, trained, and ready to fight and win, unhindered by threatened or actual CBRN hazards."

In the future, I visualize a Chemical Corps with capabilities that are both vital and relevant to the combatant commander and the joint warfight. To achieve that goal, we must be ready to leverage technology, leadership, and training to provide warfighters with the right systems to be an effective and viable resource to the joint warfight.

The Global War on Terrorism has clarified the strategic environment, reinforced the Chemical Corps's direction, and provided impetus and urgency to accelerate the development of those needed capabilities while challenging us to stay ready to fight today and win decisively in the future.

Based on the direct threat to our homeland, we anticipate our Corps having a greater role in instituting the nation's homeland defense program. The President

(Continued on page 5)

"A Corps of professional soldiers, tactically and technically unsurpassed, imbued with the Warrior Ethos."

This train stops at the next station.

A few weeks ago, I was listening as someone read my biography to a group of people. It began with "CSM Hiltner first entered the military in 1969." What immediately came to my mind was "Dang, I'm old." Many in the audience probably thought the same thing. What it really says is that I have been a soldier since 1969 and that I have been associated with the greatest profession in the world during the past five decades. I consider it an honor to say, "Yeah, I've been a soldier since 1969."

CSM Peter Hiltner

It doesn't seem that long ago when—as an 18-year-old civilian—I got off the bus in Fort Lewis, Washington, and met two individuals I will never forget: Drill Sergeant Goff and Drill Sergeant Washington. They taught me things I will never forget. I recall Goff's "pleasant" voice as he introduced me to my new name: "Puddin'." There were other names that Goff and Washington used, but I will not address those here. My first day began in a warehouse full of potatoes, where I was given a peeler and told to get busy.

Basic taught me about button-down cotton fatigues, butt cans, and the center hallway in the bay—impossible to keep clean and reserved for drill sergeants. We had footlockers, we rolled our socks, and we never used anything that was on display. I remember returning from training to find the contents of the barracks emptied into the company street. We were mad, but we knew we had failed to meet the drill sergeants' standards. The Inspector General's Office or the Equal Opportunity Office was not part of the equation. The training was tough. We double-timed to all the training sites carrying our M14s at port arms. Our weapon became our best friend. We never talked about quitting or refusing to train. Like our fathers and grandfathers before us, we knew it was our duty to serve, and we accepted it.

After Fort Lewis, I began my tour with the Minnesota Army National Guard. I was a cook in a Signal Company. Oh, did I forget to tell you my MOS was 11B infantryman? I recall the day that I left the National Guard; our commander said that some of us would return to the military. At the time, I thought this guy was crazy! But in 1978, I was back. Again, I found myself in basic training, this time at Fort McClellan, Alabama, and the rest is history.

A short story, but not complete. The Army in the '60s was all about Vietnam. To me, the '60s was all about rock and roll. Life was good. I was making about $100 a month, and movies on post were free.

In the '70s, the Army was out of Vietnam, the Chemical Corps was no longer needed, and life as a soldier seemed a little easier. Disco was alive and well. Physical training existed but was not practiced often. Sergeants major were referred to as "Smadge."

When we got to the '80s, disco was dead. Ironically, people in country bars started to dance in lines, and that looked like disco to me. Soldiers would meet on the street, and it could take up to 5 minutes to shake hands. Articles 15 were posted in the mess hall where everyone ate, and commanders had "Night Court" on the training schedule. We had a lot of money back then. I remember replacing parts on vehicles because they looked old, and we were having maintenance team inspections. Going to the National Training Center was a big deal. We were trying to find ways to get to the field to train—money just wasn't an issue.

Then we entered the '90s. The Cold War was over. We taught Iraq a valuable lesson, and it was now time to draw down. Time to figure out how we could do more with less and do it with zero defects. The Army was kind and gentle. Life was good. Privates were paid about $1,000 a month. Recreational things started to disappear—stuff soldiers had grown accustomed to (craft shops, clubs, etc.)—because they weren't making enough money.

Now we are in the 2000s, the new millennium, the Army of One, the black beret, Y2K, and Generation X. The Army is not what it used to be.

Somewhere in all that we started saying HOOAH! What did we say before HOOAH? I asked a couple of soldiers, and no one seems to remember. I know it started somewhere, I just don't remember why. I remember standing at parade rest and saying "Yes, sergeant" and "No, sergeant." Maybe that's what we used to say.

A lot has happened in the Army over the last five decades. Some of it will be part of history forever. Many great ideas and great soldiers made contributions. The Army is not what it used to be, thanks to the efforts of all those soldiers. Of course, the Army has never been what it used to be. That's what it's really all about—change. If we did business today as

we did in the '60s, we would be in serious trouble. The Army of today is truly an Army of One. There is no more National Guard, Army Reserve, or active duty. It is just simply the Army. In battle, we all will bleed the same; and at the end, we all will stand together in victory.

One area where I have seen major changes is in our NCO Corps. Today, it is more respected, better trained, and better equipped; we lead with distinction and provide positive role models and mentorship for our subordinates, peers, and supervisors. The NCO Corps is the backbone of today's Army and the key ingredient to the future of our Army. The NCOs of today are the ones our nation has called on to lead our soldiers into the next battle. The NCO Corps is largely responsible for the Army of today. Drill Sergeants Goff and Washington, back in 1969, were part of that change. Like Sergeant First Class Albert, my first platoon sergeant, you are part of that change.

As NCOs, we are the ones who have to stand in the face of fear and tell someone the straight facts. America's sons and daughters have been entrusted to us. We are the standard bearers of freedom.

Since 1969, I have come in contact with hundreds of NCOs. Some taught me the right way to do things; some demonstrated the wrong way to do things. Today we have the Army Values, the Soldier's Creed (below), Warrior Ethos, and the NCO Creed. Get reacquainted with these concepts. The power in the written words and the insight you find if you look beyond the words are invaluable.

The time has come to get back to the basics. If you are willing to look past a soldier who is not performing to standard, then you have just set a new standard. The soldier will be an NCO someday and will carry that poor standard you set with him. Demonstrate to soldiers what it means to be the "backbone" of the Army. Your challenge is to take the Army to the next level. There is no doubt in my mind that you—*the backbone of the Chemical Corps*—can do it!

So if someone says to me "You've been in the Army since 1969?" I will answer "Yeah! And I'm an NCO!" The Army has been great to me and to my family, but all good things must come to an end. You see, the train has reached the station, and it's time for me to get off. God bless you all.

Soldier's Creed

I am an American Soldier.

I am a Warrior and a member of a team. I serve the people of the United States and live the Army Values.

I will always place the mission first.

I will never accept defeat.

I will never quit.

I will never leave a fallen comrade.

I am disciplined, physically and mentally tough, trained and proficient in my Warrior tasks and drills. I always maintain my arms, my equipment, and myself.

I am an expert, and I am a professional.

I stand ready to deploy, engage, and destroy the enemies of the United States of America in close combat.

I am a guardian of freedom and the American way of life.

I am an American Soldier.

(Chief of Chemical, continued from page 2)

wants "…a group of dedicated professionals who wake up each morning with the overriding duty of protecting the American people." With the technology, training, and professional soldiers in the Chemical Corps, who is better suited to help plan and execute the nation's strategy against weapons of mass destruction incidents or attacks?

The Army's superior performance during the combat phases of Operation Iraqi Freedom validated the professionalism, valor, and bravery of our soldiers. Our reputation as the best-led, best-trained, and best-equipped Army in the world goes without question. The Chemical Corps's contribution to that performance is measured in events not necessarily highlighted by the media.

Chemical soldiers have accompanied every unit deploying to Operation Iraqi Freedom. To date, 31 percent of the officers and 46 percent of the enlisted soldiers in the active chemical force are deployed or going to deploy in support of operations around the world. These numbers do not take into account the hundreds of Reserve Component chemical soldiers called to active duty in defense of our nation.

Dragon Soldiers have been involved in every aspect of the search for weapons of mass destruction in Iraq, working with joint teams involving our sister services and foreign allies. These efforts validate our doctrine, give us a glimpse of our future roles, and improve our operational jointness.

The Army has always answered the call to duty. Throughout our nation's history, the Army has deterred, compelled, reassured, and supported the nation in peace and war. Since World War I, the Chemical Corps has participated in every conflict imposed on our country, and Dragon Soldiers have bestowed honor to the Corps with untold bravery and professionalism.

Here at the Chemical School, we have done everything possible to support deploying units by quickly reacting to many urgent-need requirements for improved CBRN defense systems, providing chemical soldiers from our own staff to support personnel shortages, furnishing technical reachback capabilities on CBRN procedures and, most importantly, supplying the Army's need for tactically and technically proficient chemical soldiers.

The ultimate goal of our efforts will be an Army that is 100 percent mission-capable when threatened or forced to operate in a CBRN environment; it is an Army trained, equipped, and confident in its ability to fight and win unimpeded by weapons of mass destruction. To achieve this goal, we must assist the Army in developing and acquiring the training, systems, and soldiers needed to make the Army invincible to CBRN attacks.

"A capability, both vital and relevant, for the combatant commander and the joint warfight."

A few years ago, Army senior leadership undertook the task of transforming the Army into a force that is more dominant at every point on the spectrum of military operations. The tenants of that Vision—people, readiness, and transformation—remain the cornerstones of our efforts.

In his arrival message, General Schoomaker, the Chief of Staff of the Army, addressed transformation. He said, "As long as the United States Army has existed, we have transformed…and we always will….Our azimuth to the future is good. The Army must remain relevant and ready."

We cannot predict what other changes the future will bring, but what will not change is the need for the Army to provide our nation the best-trained, best-led, and best-equipped soldiers in the world. What I am sure of is that the Chemical Corps will continue its long tradition of support to the nation. Since the early 1980s, the Corps has undergone an extensive revitalization. This has included the creation of a chemical battle staff at all echelons of the Army, activation of numerous chemical troop units, and the development of CBRN consequence management procedures. This revitalization is supported by new modern facilities for chemical training here at Fort Leonard Wood, Missouri; research, development, and engineering at Aberdeen Proving Ground, Maryland; acquisition management by the Joint Program Executive Office; materiel testing at Dugway Proving Ground, Utah; and equipment production at Pine Bluff Arsenal, Arkansas. In addition to the personnel infrastructure and facilities, we must develop a branch of professional soldiers who are the unquestioned experts in the operational art, the technical aspects of CBRN defense, and the development and acquisition of the technologies and systems to accomplish our mission. My intent is that no matter what your job, no matter your unit of assignment, no matter where you're located, you are a soldier first—imbued with the Warrior Ethos.

The future of our Corps starts here at the Chemical School. Daily, we are finding ways to meet transformation challenges head-on. We are continually

seeking improvements in every facet of soldier and unit development. We are working countless initiatives, but I specifically wish to address just a few:

The changing face of conflict mandated a revisit of our doctrinal construct, which allows us to address adaptive and emerging threats. This new CBRN doctrinal concept is framed in the areas of *sense*, *shape*, *shield*, and *sustain*.

Sense provides the capability to maintain awareness of the current CBRN situation by detecting and identifying CBRN hazards in the air; in water, food, or soil; on personnel, equipment, or facilities—and determining the state of those hazards. This capability also enables the continued monitoring and identification of CBRN hazards to support operational planning and execution, shielding and sustaining decisions, and the confirmation that no hazard is present. Sense is the key enabler, using knowledge-based human and artificial intelligence for shaping the awareness of the CBRN hazard. This capability also incorporates intelligence warning, weapons events, detector alarms, and sentinel casualties as trigger events to ensure that all-source intelligence is used.

"All of our future doctrinal efforts will be framed in the sense, shield, shape, and sustain construct."

Shape characterizes the CBRN hazard. CBRN characterization is the process by which commanders develop a clear understanding of the current and predicted CBRN hazard situation, envision critical mission end states, and visualize the sequence of events that moves an installation or deployed force from its current state to those end states. It manually and automatically collects and assimilates CBRN hazard information from military forces, coalition allies, host nations, and private/nongovernment organization assets in near real time to inform personnel to take action and to provide actual and potential impacts of CBRN hazards. Shaping the CBRN hazard situation accomplishes two important objectives: First, it allows the critical asset of deployed forces to continue mission-critical operations under CBRN hazard conditions. Second, it protects personnel, which contributes to mission effectiveness.

Shield embraces our capability to prevent or reduce casualties under CBRN hazard conditions by reducing the threat, reducing operational vulnerability, and avoiding contamination. Commanders will be able to shield personnel and critical equipment and provide information assurance when necessary by providing appropriate levels of physical protection and medical treatment. Commanders must have the capability to rapidly respond, assess, and conduct recovery operations; safeguard personnel from hazards; control contamination; and restore operations to preincident conditions.

Sustaining critical operations during an attack, and resuming essential operations after an attack, requires the capability to sustain operations and to eventually restore personnel and equipment to preincident operations. Mission recovery and sustainment are undertaken concurrent with or subsequent to initial response actions to maintain, restore, or sustain mission operational capability. The joint force must be able to continue operations through the conduct of decontamination and medical actions.

All of our future doctrinal efforts will be framed in these critical doctrinal tenets. They will form the basis for both Army and multiservice CBRN doctrine in the future.

As you may be aware, there is a plan for a major reorganization of our chemical units, including the development of multicapable chemical companies, which will enhance the efficacy available to the combatant commander. This reorganization will consolidate functions and simplify unit structure. Additionally, high-end technical response has been evolving over the last decade. Part of that evolution is the activation of the Guardian Brigade and the future Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive (CBRNE) Operational Headquarters. These units will add new dimensions to our Corps and provide true full-spectrum protection against CBRN incidents.

Training for Chemical Corps soldiers is one of my top priorities. The school is constantly revising our course programs of instruction in order to maintain relevancy in the full spectrum of operations and to ensure that we are producing 21st century warriors, skilled in the contemporary operational environment. Additionally, we have made enormous efforts in improving leader development in the Chemical Corps. We must train our chemical leaders to meet all the challenges of the ever-changing operational environment so vital for the success of the Future Force.

Developing CBRN material capabilities in support of the Future Combat System is another high-level priority. In this arena, our greatest challenge is keeping up with ever-changing technological improvements. My goal is to put useful and dependable equipment in the hands of our soldiers as quickly as possible. Be assured that we are working hard to give the field quality fixes for existing decontamination, detection, and obscurant systems shortfalls. Some of

the answers are just around the corner; others may take some time.

Personnel issues remain one of my priorities. At the school, we are looking at ways to improve the supply of qualified chemical soldiers to the field. Getting the right soldiers with the right training to the right place at the right time is paramount to our success as a Corps. As part of the solution, we must aggressively see that qualified chemical specialists are sent to the E-5 board and promoted to sergeant. This will reduce the shortfall of junior noncommissioned officers in the field and ensure proper soldier development opportunities.

As you can see, we are not resting on our laurels at the school. We continue to improve the facilities at our new home. In 2007, we will construct a state-of-the-art CBRN Responder Training Facility, which will provide world-class training to our Weapons of Mass Destruction Civil Support Teams and other chemical soldiers in positions requiring similar skills.

I've touched on many of the areas in which we are working to make the chemical soldier relevant in the future. Now I want to leave you with some final thoughts that capture the essence of my leadership philosophy. They are: *People*, *Value to the Army*, and *Relevance to the Joint Fight*.

Everything begins with people, because soldiers—Active, Guard, and Reserve—supported by dedicated Department of the Army civilians, and their wonderful families are central to everything we do. Without them, we would not have a Corps. As General Creighton Abrams taught us, "People are not in the Army, they are the Army." Our soldiers, civilians, and their families set the standard every day for selfless service. I charge you to take care of your soldiers and their families. This is our sacred trust.

Today as in the past, the Chemical Corps must provide value to the Army. The CBRN defense capabilities we provide are essential to our warfighters in winning the nation's wars and helping federal, state, and local agencies defend the homeland. We must continue to seek ways to ensure that the Chemical Corps provides value to our future Army.

Finally, our relevance to the combatant commander requires us to be more than just a reactionary force. As the recognized leader in CBRN defense, we must continue to look to the future and provide the capabilities required by our joint warfighters. We are the only service with a dedicated professional corps of CBRN experts. For 85 years, we have provided leadership to the joint CBRN defense community. However, it is imperative that we remain relevant by providing 21st century capabilities essential to protecting the joint warfighter.

Once again, I would like to express my pride in being your new Chief Chemical Officer. I look forward to seeing each of you as I visit chemical soldiers in the field. Continue your great work—I know you can accomplish anything! May God bless America, our Army, and the Chemical Corps.

Soldiers in a World War II 4.2-inch Chemical Mortar Battalion going into action. These soldiers embodied the traits essential to our 21st century chemical soldiers . . . professionals imbued with the Warrior Ethos.

Department of Defense Response Capabilities for CBRNE Consequence Management

By Professor James Kievit and Mr. John Auger

The Spring/Summer 2002 issue of *NBC Report* presented an excellent macro-level discussion of the Department of Defense (DOD) procedures for responding to weapons of mass destruction events.[1] This article surveys the available DOD chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) response capabilities and begins with a description of the joint Chemical Biological Rapid Response Team (CB-RRT). The team is a unique organization that can coordinate domestic consequence management for CBRNE situations and the organizations responding to them.

CB-RRT Organization

Although the events of 11 September 2001 catapulted the awareness of potential domestic CBRNE events into the public eye, the U.S. Army has actually maintained some capability to respond to these incidents since 1943. That year, the U.S. Army Chemical Corps first established its Guard and Security Division, a special unit that handled chemical weapons transfers. Today's CB-RRT, a subordinate organization of the U.S. Army Soldier and Biological Chemical Command (SBCCOM), is a logical and more capable extension of that heritage considering today's more complex security environment. Organized by DOD in 1997, the CB-RRT was designed to provide chemical and biological defense support to civil authorities. The CB-RRT mission is to deploy to any CBRNE incident site or designated national security special event to coordinate and synchronize the DOD technical support for the lead federal agency.[2]

The CB-RRT is a joint organization that includes DOD civilian employees. In addition to command-and-control know-how, team members have the specialized chemical, biological, medical, and explosive ordnance disposal (EOD) expertise needed to provide technical assistance to first responders and federal, state, and local officials. The unit is colocated with the SBCCOM 24-hour operations center at the Edgewood Area of Aberdeen Proving Ground, Maryland, and can deploy using organic SBCCOM Army air assets, U.S. Transportation Command assets, or commercial air transportation. Once deployed, the CB-RRT is self-sustaining for up to 72 hours.

The CB-RRT reports to the SBCCOM deputy commanding general for homeland security. The team can act in direct support of a lead federal agency, or it can be placed under the operational control of a combatant commander, a joint special-operations task force, or any other designated joint task force. The team possesses an integrated, self-contained, and deployable command, control, communications, computers, and intelligence (C4I) infrastructure that permits an integrated, structured, and controlled planning and incident response capability. The CB-RRT sends forward elements to provide technical expertise and contingency development options during times of crisis. The team has a sophisticated reach-back capability through the SBCCOM operations center to access some of the nation's leading chemical and biological technical experts without the need for those experts to be deployed to an incident site.

CB-RRT Communications

The primary communications systems used by the CB-RRT are the Deployable Response and Graphics Operations Network (DRAGON) System and the Deployable Communications System (DCS).[3] The DRAGON, a suite of computers and supplementary hardware used to integrate all aspects of communication and emergency planning/response software, is a local-area/wide-area computer network. The DRAGON allows multiple users to gain access by hard wire, satellite, or Internet and provides situational awareness as the main information management tool for the CB-RRT staff. The DCS is a self-sustaining

mobile satellite communications system that provides forward-deployed elements with secure and nonsecure telephone interface, video teleconference interface, Secret Internet Protocol Routing Network (SIPRNET), and digital cellular telephone service that are separate from local networks. The organic capabilities of the CB-RRT can be reinforced by a number of DOD and non-DOD federal organizations.

DOD CBRNE-Related Organizations

Some information about the most important of the DOD organizations follows:

CBRN Installation Support Teams (CBRN-ISTs)

The Army is fielding these new chemical, biological, radiological, and nuclear (CBRN) defense teams to provide commanders with additional capabilities for responding to weapons of mass destruction situations that might affect their installations or the local communities surrounding them.

CBRN-ISTs support installation antiterrorism/force protection planning and provide an organic CBRN response capability at each Army installation. Although the teams are matrixed organizations mainly comprised of additional-duty installation personnel, their planned design capabilities minimize casualties, reduce the spread of contamination, and include—

- Advising the commander.
- Performing chemical, biological, and radiological detection, warning, and reporting.
- Conducting triage and emergency medical procedures and limited decontamination operations.

During an actual CBRNE incident, it is likely that the joint CB-RRT would have significant interaction with the Army CBRN-ISTs; therefore, it should be expected to have such interactions during training and planning preparations.[4]

U.S. Army Technical Escort Unit

It provides chemical and biological advice, verification, sampling, detection, mitigation, render-safe, decontamination, packaging, escort, and remediation of chemical and biological devices or hazards worldwide in support of crisis or consequence management. The unit also supports the development of chemical and biological defense equipment, technical intelligence, and doctrine. Headquartered at Aberdeen Proving Ground it has two companies colocated there and other companies at Dugway Proving Ground, Utah; Fort Belvoir, Virginia; and Pine Bluff Arsenal, Arkansas. The companies can be deployed worldwide.

Edgewood Chemical Biological Center

It is the principal research and development center for chemical and biological defense technology, engineering, and service for the Army, and its personnel can be deployed to a site to collect samples and bring them back for analysis. In addition, the center has developed a mobile laboratory to support the verification and enforcement of international chemical weapons treaties. Equally important, the center has trained more than 28,000 first responders in 105 communities across the country.

U.S. Army Medical Department (AMEDD)

It provides the Army with cohesive, synchronized medical capability, leveraging institutional knowledge and capabilities to support operational requirements. This includes providing reachback support, telemedicine, trained personnel, and Special Medical Augmentation Response Teams (SMARTs). AMEDD, with which the joint CB-RRT has an existing memorandum of agreement, has a number of other specialized organizations that can support consequence management during a CBRNE event:

- *U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)*—Serves as the lead laboratory for the medical aspects of biological warfare defense, conducting research to develop vaccines, drugs, and diagnostics for laboratory and field use. USAMRIID also develops strategies, information, procedures, and training programs for medical defense against biological threats.

The DRAGON System

- *U.S. Army Medical Research and Materiel Command (USAMRMC)*—Operates six medical research laboratories and institutes in the United States and is responsible for the Army Medical, Chemical, and Biological Defense Research Program. This command is the medical materiel developer and logistician for the Army.
- *U.S. Army Center for Health Promotion and Preventive Medicine*—Provides health promotion and preventive medicine leadership and services to counter environmental, occupational, and disease threats to health, fitness, and readiness.
- *SMARTs*—Responds to disasters, including CBRNE incidents. Each of the four U.S. Army Regional Medical Commands has a chemical-biological SMART (identified as a SMART-CB) designed to provide critical medical support activities at CBRNE events.
- *520th Theater Army Medical Laboratory*—Deploys worldwide, conducting theater-level health threat surveillance to protect and sustain the health of the force.

U.S. Navy Bureau of Medicine and Surgery

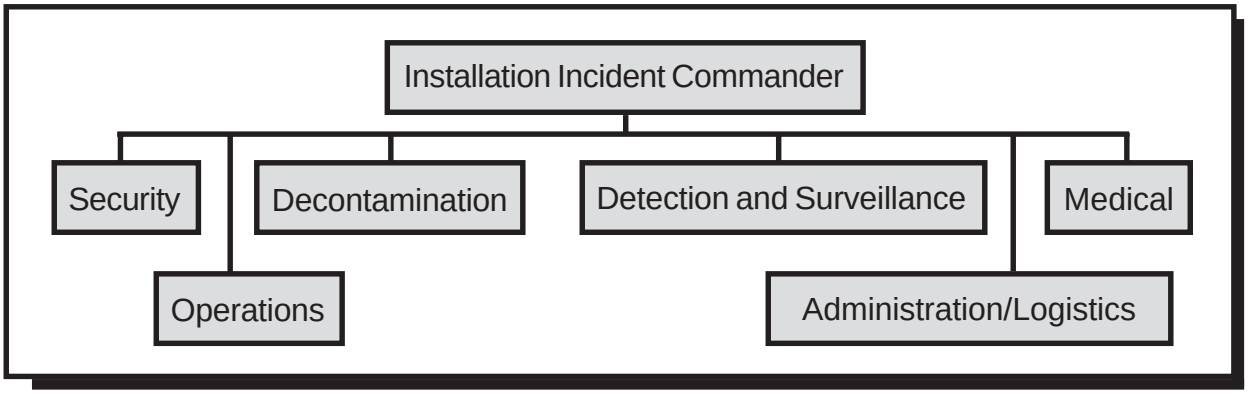
It also has a memorandum of agreement to support the CB-RRT and its assets:

- *U.S. Navy Medical Research Center*—Conducts research and development and tests and evaluations that enhance the health, safety, and readiness of Navy and U.S. Marine Corps personnel.
- *U.S. Navy Environmental Health Center*—Manages disease prevention and health promotion within the Navy.
- *U.S. Navy Environmental and Preventive Medicine Units*—Provides specialized consultation, technical support, recommendations, and advice in matters of environmental health, preventive medicine, and occupational safety to Navy and Marine Corps shore activities and units of the operational forces.

Defense Threat Reduction Agency (DTRA)

It runs a 24-hour operations center that provides both civilian first responders and warfighters with a single point of contact for online assistance and the dispatch of other agency resources to deal with CBRNE incidents. DTRA also has a—

- *Consequence Management Advisory Team*—Provides joint technical support with expertise in CBRNE response procedures, requirements, resources, command and control, health physics, public affairs, legal affairs, and specialized technical information.
- *Weapons of Mass Destruction Assessment and Analysis Center*—Provides network support to perform online collaborative computing and access to computer modules for CBRNE analysis and consequence prediction, high-resolution weather data, data files on CBRNE materials, teleconferencing capabilities, and national experts.
- *Joint Nuclear Accident Coordination Center*—Operates with the Department of Energy (DOE) to provide a centralized center for maintaining and exchanging information with agencies possessing radiological-assistance capabilities. The center coordinates assistance from those agencies in response to an accident or incident involving radioactive materials.
- *U.S. Marine Corps Chemical Biological Incident Response Force*—Enters a CBRNE environment and provides agent identification, monitoring, sampling, and "hot-zone" triage and



CBRN Installation Support Teams

emergency medical treatment. The force's 350 to 375 Marine Corps and Navy personnel also extract victims, decontaminate them, and turn them over to local emergency services personnel for follow-on care.

- *U.S. Army 52d Ordnance Group (EOD)*—Provides bomb squad units to defeat or mitigate hazards from conventional, nuclear, or chemical military munitions and CBRNE throughout the continental United States. Select EOD companies receive specific training on CBRNE and operate specialized equipment to diagnose and render safe/mitigate a CBRNE device.

National Guard Bureau

It possesses a number of Weapons of Mass Destruction Civil Support Teams (WMD-CSTs) whose mission is domestic consequence management support.[5] The teams support local, state, and federal government agencies during a CBRNE incident in the United States with emphasis on preparing for, responding to, and recovering from the potentially catastrophic effects of a terrorist-employed weapon of mass destruction. The unit is jointly staffed with 22 full-time Army and Air National Guard members trained in 14 different military occupational skills. The WMD-CSTs are equipped with high-end detection, analytical, and protective equipment.

Non-DOD CBRNE-Related Organizations

Other agencies of the federal government possess some CBRNE response capabilities:

U.S. Coast Guard (USCG) Federal On-Scene Coordinators (FOSCs)

They can coordinate all federal containment, removal, and disposal efforts and resources during an incident in a coastal zone. The USCG also has a National Strike Force that provides around-the-clock access to special decontamination equipment for chemical releases and advises the FOSCs about hazard evaluation, risk assessment, multimedia sampling and analysis, on-site safety, and cleanup techniques.

Federal Emergency Management Agency (FEMA)

It can provide Urban Search and Rescue Teams and the Rapid Response Information System—a database containing information on federal nuclear, biological, and chemical (NBC) response capabilities, NBC agents and munitions characteristics, and safety precautions.

Department of Health and Human Services (DHHS)

This organization has a goal of fielding 100 Metropolitan Medical Strike Teams with the capabilities for agent detection and identification, patient decontamination, triage and medical treatment, patient transportation to hospitals, and coordination with local law enforcement activities. The DHHS National Medical Response Teams are capable of agent identification, patient decontamination, triage, and medical treatment in support of local health systems. The DHHS Center for Disease Control and Prevention (CDC) provides epidemiological surveillance, biological agent identification, and public-health consultation and response.

Federal Bureau of Investigation (FBI)

The FBI has a number of assets:

- *Hazardous Materials Response Unit*—Performs specialized sampling, detection, and identification for NBC agents.
- *Evidence Response Teams*—Conducts crime-scene documentation and evidence collection in support of criminal investigations.
- *Critical Incident Response Groups*—Assembles to conduct tactical and crisis-management efforts.

Environmental Protection Agency (EPA)

Its capabilities are as follows:

- *Environmental Response Team*—Provides 24-hour access to special decontamination equipment for chemical releases and advice to the on-scene coordinator in hazard evaluation, risk assessment, multimedia sampling and analysis, on-site safety, and cleanup techniques.
- *Radiological Emergency Response Team*—Provides on-site monitoring and mobile laboratories for field analysis of samples and expertise in radiation health physics and risk assessment.
- *National Enforcement Investigations Center*—Provides expertise in environmental forensic evidence collection, sampling, and analysis; computer forensic and information management; and enforcement-related analysis.
- *Environmental Radiation Ambient Monitoring System*—Monitors radioactivity in samples of precipitation, air, surface water, drinking water, and milk. In the event of a radiological emergency, sampling at the approximately 260 monitoring sites can be increased to provide information on the spread of contamination.

- *Radiation Environmental Laboratories (2)*—Provide advice on how best to protect public health in emergency situations. Twelve additional research laboratories provide analytical and other technical support to quality-assurance programs related to air, water, wastewater, and solid waste.

DOE

It has a robust capability for dealing with CBRNE incidents that include the—

- *Radiological Assistance Program*—Provides the initial DOE radiological emergency response.
- *Radiation Emergency Assistance Center/ Training Site*—Provides 24-hour medical consultation about the health problems associated with radiation accidents.
- *Nuclear Emergency Search Team*—Provides technical responses to the resolution of incidents involving improvised nuclear and radiological dispersal devices.
- *Joint Technical Operations Team*—Provides technical advice and assistance to DOD. This is a combined DOD and DOE team.

Conclusion

To be successful in today's complex and uncertain environment, any national military strategy must give the President and the Secretary of Defense a sufficient variety of options so they can take effective action at whatever time and location is required. While one should never be sanguine when dealing with CBRNE, it would appear that the capabilities represented by the organizations, systems, and competencies described in this article should suffice to meet this requirement with respect to responding to a single CBRNE event. Responding to multiple events would be more challenging, but perhaps even that should not prove impossible so long as these capabilities continue to be properly executed by well-trained, high-quality people who are directed and aggregated by a knowledgeable and adaptive leadership—with a complete understanding of the capabilities that the government has available.[6]

Endnotes

[1]Duncan McGill, "Department of Defense Support to Domestic Consequence Management," *NBC Report*, Spring/ Summer 2002.

[2]The CB-RRT focus is domestic, but it can respond worldwide if directed.

[3]See Appendix D-1 of FM 3-11.21/MCRP 3-37.2C/ NTTP 3-11.24/AFTTP (I) 3-2.37, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical Aspects of Consequence Management*, 12 December 2001, for a detailed description of these capabilities.

[4]See the U.S. Army Training and Doctrine Command CBRN Force Protection Operational and Organizational Plan, Version 4.0, for additional details about the CBRN-IST and CBRN-RRT concepts.

[5]Currently 32 are programmed, although not all have achieved operational status at the time of this article.

[6]Additional detailed information on these and some other CBRNE-related DOD organizations may be found in FM 3-11.21.

Professor Kievit is the Professor of National Security Leadership with the Operations and Gaming Division of the U.S. Army War College Center for Strategic Leadership. He graduated from the U.S. Military Academy and served more than 24 years as a Corps of Engineer officer in a variety of combat engineer and strategic analysis assignments. Professor Kievit holds master's degrees in history and in engineering construction management from the University of Michigan. He also holds a master's in military art and science from the U.S. Army School of Advanced Military Studies.

Mr. Auger is a defense consultant with Booz Allen Hamilton, Incorporated. He is a graduate of the U.S. Army War College and holds graduate degrees in history and international relations from the University of Scranton and the University of Southern California, respectively. His more than 28 years of military service culminated in the position of director of the Chief of Staff of the Army Strategic Outreach Initiative.

The Dragon's Challenge

By Captain Troy Paisley

An old infantryman once said that the expert infantryman badge (EIB) "is a mark of a man." The coveted EIB is a uniform accoutrement that all infantrymen aspire to attain. The annual testing for this award is an event that not only provides soldiers an opportunity to excel but also allows commanders to emphasize unit individual training and team building. Many of the tasks that are evaluated during the EIB competition are common skills with which all soldiers should be familiar. Current events in the Middle East underline the need for all soldiers to repeatedly hone their basic combat skills such as weapons maintenance, call for fire, and land navigation. Therefore, all commanders, regardlesss of branch, should develop innovative ways to train these skills as an integral part of soldier readiness. The EIB competition can be a time-tested framework for combat support and combat service support leaders to use during their training year to augment common task training.

The Dragon's Challenge is an annual event that the 126th Chemical Battalion of the Nebraska Army National Guard uses to mirror the individual training framework of the EIB training and competition. Under the same concept established in the EIB competition and testing, the unit created an annual event that challenges soldiers but not unit resources. As a National Guard unit, this competition not only provides an opportunity to build unit cohesion but also allows the battalion to fulfill most of its annual common task testing requirements. Moreover, to ensure training on chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) skills, the battalion added a training twist that incorporates mission-oriented protective posture (MOPP) 4 and military occupational specialty (MOS) 74D (chemical operations specialist)

The high bars are part of the physical fitness aspect of the Dragon's Challenge.

skill level 1 tasks. The unit evaluated the following tasks during its three-day competition:

Day 1

- Complete the Army Physical Fitness Test.
- Employ and recover an M18A1 claymore mine.
- Assemble and perform a functions check for an M249 machine gun.
- Evaluate a casualty and prevent him from going into shock.
- Maintain an M16-series rifle.
- Prepare and submit a nuclear, biological, and chemical (NBC) 1 report.
- Prepare a chemical downwind message.
- Report information of potential intelligence value.

Day 2

- Complete the land navigation course.
- Identify topographic symbols on a map.
- Measure distance on a map.
- React to indirect fire in MOPP4.
- Prepare the improved chemical agent monitor (ICAM) for operation.

Day 3

- Use the protective mask with hood to prevent chemical contamination.
- Operate the M8A1 chemical agent alarm.
- Administer nerve agent antidote to a casualty.
- React to a nuclear hazard.
- Request the medical evacuation of a casualty.
- Call for and adjust indirect fire.
- Exchange MOPP gear.
- Identify chemical agents using M8 or M9 detector paper.
- Complete an obstacle course.

A soldier adjusts a teammate's protective mask during the competition.

Unlike an EIB competition, the Dragon's Challenge was completed by four-member teams, which trained during the drills that were held just before the competition. Also unlike an EIB competition, the winning team members received Army Commendation Medals and a commander's coin, while the second-place team's members were awarded Army Achievement Medals. The operations officer and the full-time staff coordinated all resources and ensured that risk assessments were completed for each individual event. The Public Affairs Office covered the competition and provided media coverage.

An event such as the Dragon's Challenge can be a unit training and retention multiplier. The benefits that come from unit competitions that incorporate individual and MOS-specific training can be measured during unit evaluations, by the retention figures and, more importantly, on the battlefield. It is the responsibility of commanders to recognize new and innovative ways to retain and train today's soldiers. The Dragon's Challenge can be the "mark" of the chemical soldier.

Reference

STP 21-1-SMCT, *Soldier's Manual of Common Tasks Skill Level 1*, 31 August 2003.

Captain Paisley is the commander of the 754th Chemical Company in Omaha, Nebraska. He is also the full-time Active Guard and Reserve adjutant for the 126th Chemical Battalion of the Nebraska Army National Guard. He holds both a bachelor's and master's in history.

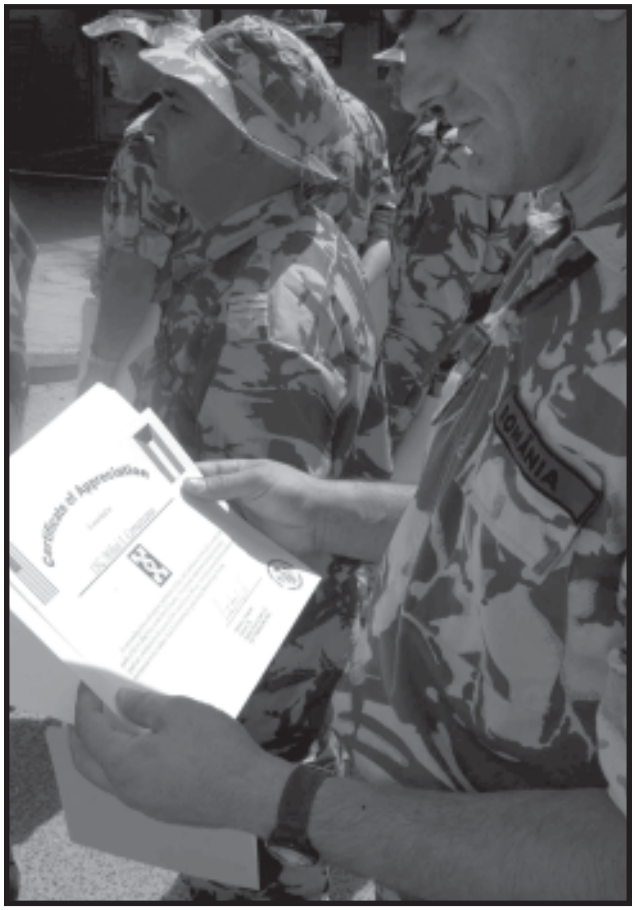
Romanians Get "Perfect 10" for Coalition NBC Performance

By Staff Sergeant Thomas N. Orme

Standing in formation in the morning Kuwaiti sun, about 40 soldiers from the 383d Nuclear, Biological, and Chemical (NBC) Defense Company, Bistrita, Romania, accepted certificates from the 143d Transportation Command, Orlando, Florida, for an outstanding job of washing more than 30,000 containers and vehicles, preparing them for redeployment.

The Romanian NBC unit arrived in theater eight days before the start of Operation Iraqi Freedom in March 2003. The 383d, part of the Romanian 81st Mechanized Brigade, numbered about 50 originally, but about 20 new soldiers were added before coming to Kuwait. For the first two months in theater, the Romanians worked as part of the Combined Joint Task Force consequence management operations at Camp Doha, Kuwait, alongside German, Czech, Slovak, and Ukrainian NBC units. The Romanians brought 38 vehicles to Kuwait: NBC trucks that could haul 4 tons of water, jeeps, 380-volt-generator trucks, 5-ton trucks, decontamination trucks, and armored personnel carriers (APCs). They also had an NBC reconnaissance platoon with four APCs, in addition to a logistical platoon and a maintenance platoon.

In May, the unit began its redeployment mission with the 143d at Port Shuaiba, Kuwait. Vehicles had to be sterile before they could be redeployed. Dirt, mud, beehives, and vegetation had to be removed. Cleaning the containers is mandated by the U.S. Department of Agriculture because baked-on dirt



A Romanian soldier looks over his certificate, given by a grateful 143d Transportation Command for help with redeployment operations.

A Romanian soldier cleans a container at the wash point at Port Shuaiba, Kuwait.

might contain bacteria or hide Mediterranean fruit flies that can cause billions of dollars of agricultural damage if they are brought into the United States and allowed to multiply.

The 143d Transportation Command built wash racks, but both the containers (typically 20- or 40-foot standard military vans) and the vehicles needed to be cleaned. The 383d NBC team could provide this service 24/7, so the 143d set up a wash point at the port so that the Romanian soldiers could perform rinse-down operations for containers and vehicles. The Romanians worked 12-hour shifts and cleaned an average of 300 containers per day. They used the rough-terrain cargo handler (RTCH, which is pronounced *wretch* and is similar to a large forklift) to pick up the containers and wash them. The Americans cleaned the taller vehicles by standing on a bridge.

At the container wash point, the U.S. military police (who were certified as customs border clearance agents by U.S. Customs and Border Protection) examined the containers and checked for security seals, forms, and "trackers"—devices which can be attached to containers to emit a signal that can be tracked by a Global Positioning System receiver. Some of the truck convoys arriving at the point were more than 1/2-mile long with 200 containers that required about 12 hours to clean. If a container did not pass inspection, it was moved to the "frustrated cargo" area until the problem was corrected.

The same day the unit received its certificates, the first of approximately 700 more Romanian soldiers and their equipment arrived at Port Shuaiba. The force, which included military police, engineers, and infantrymen, immediately moved to Iraq to assist coalition forces in ongoing Operation Iraqi Freedom missions.

Staff Sergeant Orme is the public affairs noncommissioned officer for the 3d Personnel Command.

Soldier Safety

Motorcycle Rider Risk Management

By Mr. Fred E. Fanning

Can risk management be the solution to everything? Maybe not, but it can go a long way toward preventing fatal motorcycle accidents. The Motorcycle Safety Foundation (MSF) has done a great deal of work to develop training programs to provide riders with the skills necessary to prevent motorcycle accidents. Riding a motorcycle can be a very dangerous sport or activity. However, by training properly and applying risk management, riders can help prevent crashes. The Army uses the MSF curriculum for motorcycle rider training as the standard.

History

In the 25 April 2003 issue of *USA Today*, Jayne O'Donnell reported that motorcycle fatalities were up in 2002 for the fifth straight year.[1] She indicated that this was a 3 percent increase. Ms. O'Donnell obtained her information from the National Highway Traffic Safety Administration, which has two very interesting reports on this subject on its Web site at <*http://www.nhtsa.dot.gov*>.

In an article in the April 2003 *Countermeasure* publication, Master Sergeant Dave Hembroff raised the issue of motorcycle riders' risk of being involved in an accident.[2] He indicated that a rider who had not taken a rider training course was nine times more likely to be involved in an injury accident. Through February 2003, Army personnel had 18 motorcycle accidents for the fiscal year. Six soldiers died in those accidents.

Conducting Risk Management

Accidents are normally the result of a series of events or factors that lead up to the accident. By controlling or eliminating some of those factors, the risk of being involved in a motorcycle accident can be greatly reduced. This is the process outlined in Field Manual 100-14, *Risk Management*, that we use for military operations and should use for all aspects of our lives. There are three primary areas that should be addressed in conducting risk management for motorcycle riding: rider factors, motorcycle factors, and road and traffic factors. See Table 1 for additional information. Each of these areas contains a number of factors that determine a rider's risk of being involved in an accident.

Rider

Riders should always be prepared to ride the motorcycle. That may sound a little strange, yet it is true. The rider of a motorcycle must focus his or her attention on the task of riding the motorcycle as well as the actions of other drivers, wildlife, and the condition of the road—all at once. This is far more focus than any automobile driver puts into the task of driving.

The amount of time riders have on their motorcycles has a great impact on the potential for an accident. The more you ride, the better rider you become. As service members or Department of the Army civilian employees, motorcycle riders are required to complete a course that is offered at most

Table 1. Factors to Consider in Risk Management

Type	Factors
Rider	Experience, training, protective clothing and equipment, consumption of alcohol and drugs, and lack of sleep
Motorcycle	Size and fit and working condition
Road and traffic	Road and highway conditions

installations and provides basic information about riding. But don't let this be the only course you take. The more training you get, the better rider you will become. Go to <*http://www.msf-usa.org*> for more information about motorcycle rider courses in your area.

Army Regulation 385-55, *Prevention of Motor Vehicle Accidents*, lists the required items of protective clothing and equipment that each rider must wear. See Table 2 for a complete list. The quality of the clothing and equipment has a direct relationship to how much risk is accepted. Riders who purchase the bare-minimum clothing will reduce their risk of being injured in a motorcycle accident. However, purchasing quality motorcycle rider gear can reduce this risk even more. Helmets are a good example. Riders on a military installation must wear at least an approved 1/2-shell helmet. However, if they were to wear an approved 3/4-shell or full-face helmet, they could reduce their risk even more. The same thing goes for the shirt or pants. Riders can wear a regular pair of pants and a shirt with long sleeves and get by. But they would be much safer if they wore the new jackets and pants with ballistic protection sold by many manufacturers today. This ballistic protection is located in areas where the body is most likely to be injured in a crash. Using it will greatly reduce the risk of injury in an accident.

Since riding a motorcycle requires a great deal of concentration, it is surprising that many riders still drink and drive. If you plan to drink, don't drive. Your chances of having an accident are far greater if you have been drinking. Riders should make sure they don't take prescription or over-the-counter medications prior to riding. Read the label, and if it has a warning about driving or operating heavy equipment or machinery, that means you don't ride. Along with these hazards comes the risk of riding when you're tired. As you know, it is very hard to drive a car when you're tired; it is much worse when trying to operate a motorcycle. You may think that you are riding fine until an emergency occurs and you can't react to it.

Motorcycle

Even though you may be prepared to ride, is your bike ready to be ridden? First, does it fit you? And secondly, is it in good working order? Is the bike the right size for you? You can tell by sitting on the seat and putting both feet flat on the ground. If you can't do this, the bike is too tall. Now try to reach all the controls. You must be able to reach the handlebars, clutch lever, brake lever and pedal, throttle, and shift lever with ease. And is your bike in good working order? How do you know? The MSF has a preride checklist that is represented by the acronym T-CLOCS:

- **T** – tires and wheels
- **C** – controls
- **L** – lights and other electrical items
- **O** – oil
- **C** – chassis
- **S** – side stand

Table 2. Required Protective Clothing and Equipment

Clothing and Equipment	Description
Helmets	They come in full face, 3/4 shell, and 1/2 shell. The Department of Transportation or Schnell Foundation must approve the helmet. The full-face helmet provides the best protection followed by the 3/4 shell. The 1/2 shell provides the least amount of protection.
Gloves	They should be leather and have full fingers. It is best to purchase motorcycle gloves because they are sewn to put the seams outside the glove and curve of the fingers.
Shirts	They should have long sleeves and be made of a durable fabric. Consider a jacket or riding suit with ballistic protection.
Pants	They should be long and made of a durable fabric. Consider pants or a riding suit with ballistic protection.
Reflective materials	Many use a road guard vest or jogging belt. The jogging belt is only visible when it is worn diagonally across the torso.
Shoes	They should be over-the-ankle boots or shoes, with no high heels. Consider a pair of motorcycle boots.
Protective eyewear	Don't rely on the face shield to protect you. Wear impact-resistant eyewear even if you wear a face shield. Invest in a pair of impact-resistant sunglasses.

By conducting this quick inspection and fixing the items that don't work, you can greatly reduce your risk.

Road and Traffic

The last things to consider are the road and traffic conditions. You can choose the time and place you ride; make it the safest. Don't ride in areas with limited visibility or rough or sandy roads. These can cause or contribute to an accident. You may also want to avoid heavy traffic times. Most car and truck drivers are not watching for motorcyclists and often don't see them. Not riding in these time periods can reduce your risk.

Strategy

In addition to identifying the hazards and eliminating those you can prior to riding, the MSF recommends a strategy for riding your motorcycle. The strategy is known by the acronym SEE.

- **S** – Search for hazards constantly as you ride.
- **E** – Evaluate those hazards first to determine if they have an impact on you, then develop a course of action for each.
- **E** – Execute the course of action you determined in the evaluation step.

Sound familiar? This is a constant update of the risk management process. The more you use it, the better you will become.

Summary

Whether you are a new rider or have been riding for 20 years, you can become the victim of a motorcycle accident. You can reduce the potential for that accident by using the risk management process described in this article to identify and eliminate hazards. Don't become overwhelmed by all of the hazards. Riding a motorcycle is more dangerous than driving a car, and most—if not all—riders know this. To be a successful rider, control the hazards you can, and reduce your risk. Let motorcycling be fun and enjoyable.

For additional information, refer to the U.S. Army Safety Center Web site at *<http://safety.army.mil/home.html>* or the Motorcycle Safety Foundation Web site at *<http://www.msf-usa.org>*.

Endnotes

[1] Jayne O'Donnell, "Traffic deaths rise to 12-year high," *USA Today*, 25 April 2003, p. A-1.

[2] Master Sergeant Dave Hembroff, "Learn and Live," *Countermeasure*, April 2003, pp. 16-18.

Mr. Fanning is the safety director for the U.S. Army Maneuver Support Center and Fort Leonard Wood. He is also nationally certified by the Motorcycle Safety Foundation as a RiderCoach and serves as the RiderCoach/instructor for Fort Leonard Wood. He can be contacted at *<fred.fanning@us.army.mil>*.

Army Values

"We are, have been, and will remain a values-based institution. Our values will not change, and they are nonnegotiable. Our Soldiers are warriors of character. They exemplify these values every day and are the epitome of our American spirit. They are the heart of the Army."

— General Peter J. Schoomaker, Army Chief of Staff, arrival message, July 2003

Loyalty—Bear true faith and allegiance to the U.S. Constitution, the Army, your unit, and other soldiers.

Duty—Fulfill your obligations.

Respect—Treat people as they should be treated.

Selfless Service—Put the welfare of the nation, the Army, and your subordinates before your own.

Honor—Live up to all the Army values.

Integrity—Do what's right, legally and morally.

Personal Courage—Face fear, danger, or adversity.

Responding to Armageddon:

The National Guard Bureau Weapons of Mass Destruction Civil Support Teams

By Professor James Kievit and Mr. John Auger

On 9 September 2003, the government issued a warning that terrorists could employ chemical or biological weapons to attack civilian targets within the continental United States. At the time, we had already experienced examples of domestic weapons of mass destruction (WMD), such as the Oklahoma City bombing, the World Trade Center and Pentagon attacks, and the anthrax-contaminated mail.[1] Fortunately, the Department of Defense (DOD) established within the National Guard (NG) a unique unit organized and trained to provide domestic consequence management support for WMD incidents within the United States, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.[2] These 32 WMD civil support teams (CSTs) operate under the command and control of the state governors (and their equivalents in Puerto Rico and the District of Columbia) through their respective adjutants general. The National Guard Bureau (NGB) works closely with the U.S. Army Forces Command (FORSCOM) to ensure the standardization of the periodic CST external evaluations and has developed a Response Management Plan that places specific CSTs on a higher alert status for possible deployment to states that do not have a CST or that require backup from one or more additional CSTs. Understanding the skills of the WMD-CSTs, their organization and equipment, and how such teams are providing assistance throughout the country enhances our capability to respond quickly, effectively, and appropriately if disaster should threaten locally.

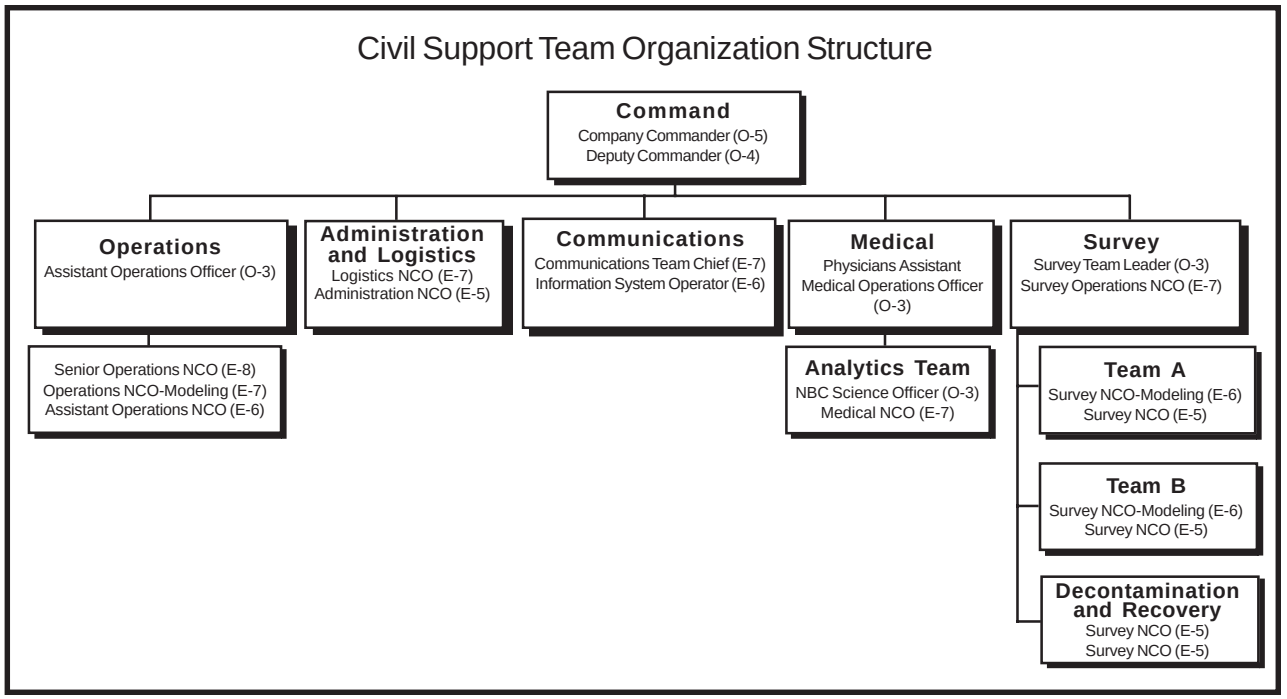
Background

The events of 11 September 2001 required the government to refine the way it operates in response to security challenges within the United States and its territories. This new mission is homeland security (HLS)—an overarching concept that includes all actions taken at the federal, state, local, private, and individual citizen levels to deter, defend against, or mitigate attacks within the United States, or to respond to other major domestic emergencies. One key aspect of HLS is homeland defense (HLD), which focuses on actions taken by DOD, non-DOD, and non-federal agencies to deter or defend against a foreign attack. Another aspect of HLS is civil-support operations. These are operations where DOD may be called upon to provide support within the United States to deal with either the consequences of a foreign attack or for emergency and law enforcement purposes. The NG has historically performed these types of missions, and it has been quick to adapt its organizations to deal with the sophistication of the threats and operational environments of the 21st century.

Mission and Organization

The WMD-CST mission is domestic consequence management support. This is support provided to local, state, and federal government agencies to manage a WMD incident in the United States, with emphasis on preparing for, responding to, and recovering from the potentially catastrophic effects of terrorist-employed WMD.

The unit is jointly staffed with 22 full-time Army and Air National Guard members and a lieutenant colonel as their commander. The unit members hold 14 military occupational specialties and are being trained and equipped to provide a technical reachback capability to call on other experts. The unit is federally resourced, trained, equipped, and sustained, with state NG units providing the personnel, stationing, and common support. A team consists of six sections—command, operations, communications, administration and logistics, medical, and survey (see chart on page 21). Each team is formed specifically to provide



advice to the incident commander to help make assessments for requirements for follow-on forces.

Training and Equipment

The WMD-CST members participate in both military and emergency first-responder training. Team members acquire approximately 600 hours of initial training above their military occupational specialty qualifications or professional military education requirements. DOD schools provide instruction in areas such as chemical and nuclear weapons, medical care, and the spread of infectious diseases. Other agencies—such as the Federal Emergency Management Agency, the Department of Justice, the Environmental Protection Agency, and the Department of Energy—also provide training. In addition to individual soldier training, more than a year of collective (unit) training is required before operational certification of a team is achieved. Following certification, the soldiers, individually, and the teams, collectively, continue to train in multiple-threat environments (hazardous material [HAZMAT] accidents and deliberate or accidental chemical or biological contamination sites) on a year-round basis to maintain proficiency.

WMD-CSTs are equipped to operate in areas containing unknown contamination. For this reason, they are required to maintain personal protective equipment sets that exceed those provided to military field forces. WMD-CSTs are also equipped with high-end detection and analytical equipment required to detect and identify a greater range of substances, including toxic industrial chemicals, organic substances, and chemical and biological warfare agents.[3] Approximately 33 percent of CST equipment is standard issue, while 67 percent is unique to support specialized mission requirements. The unit possesses satellite, secure, and cellular telephone communications to provide connectivity to civil and military forces.

Preparation

A WMD-CST combats terrorist activity on a regional basis by preparing for and responding to the increased threat presented by WMD.[4] Under the auspices of U.S. Code Title 10, *Armed Forces*, or U.S. Code Title 32, *National Guard*, a WMD-CST rapidly deploys to a suspected or actual terrorist attack or other WMD incident. Upon arrival, it conducts special reconnaissance activities focused on WMD in order to assess the effects of the incident or attack and provide situational understanding to command channels. Members of the WMD-CST interact with other federal and non-federal agencies to provide comprehensive technical and consultative services to local authorities on managing the effects of the incident and to minimize the impact on the civilian populace. Finally, the WMD-CST assists with follow-on emergency and military support, deploying to execute validated requests for assistance by civil authorities. The WMD-CST is intended to be a reinforcing capability, not to replace functions normally performed by the emergency first-responder community.

Conclusion

The unique capabilities of WMD-CSTs have made them an integral part of all recent high-visibility operations, including events like the

World Series, the Olympic games, the Super Bowl, and Mardi Gras. Since the terrorist attacks on 11 September 2001, WMD-CSTs have responded to more than four hundred incidents. About one-third of these responses have been to test powders suspected to be anthrax or to examine suspicious pieces of mail, unknown liquids, or other substances. Requests for assistance have come from a number of state emergency management agencies, state and local law enforcement agencies, hospitals, and health departments; national aid agencies like the Red Cross; and numerous federal agencies, including the Drug Enforcement Agency, the Federal Bureau of Investigation, the Department of Homeland Security, the U.S. Postal Service, and the U.S. Secret Service.

Each WMD-CST is expected to implement personnel recall procedures and maintain a 4-hour timeline level of readiness to respond to state adjutant general-validated requests for assistance. Emergency first responders, incident command system personnel, and WMD-CST members themselves should always remember that prior coordination facilitates the integration of WMD-CST capabilities and significantly improves actual response timelines. Planning, scheduling, and accomplishing such coordination across the breadth of a WMD-CST geographic region of coverage can be a major undertaking in itself, but this activity must be accomplished if we are to be truly prepared for the day when the warning of attack is replaced by the reality of an attack.

Endnotes

[1] DOD defines WMD as high-explosive or nuclear, biological, chemical, and radiological weapons that are capable of a high order of destruction and/or of being used in such a manner as to destroy large numbers of people.

[2] For additional information about the formation of the WMD-CST program, see "Chapter 2: The Response" at <*http://www.au.af.mil/au/awc/awcgate/acsc/01-200.pdf*>.

[3]This equipment may include gas chromatograph or mass selective, flame ionization, dual-wavelength flame photometric, pulse flame photometric, and halogen selective detectors. The van-mounted laboratory, also outfitted with a roof-mounted air conditioner or heater, instrument benches, and gas cylinder storage, is self-sustaining with an internal 7-kilowatt diesel generator and compressed gases supplied by gas generators.

[4] WMD-CSTs are currently based in Alabama, Alaska, Arizona, Arkansas, California (2) , Colorado, Florida, Georgia, Hawaii, Idaho, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, and West Virginia.

References

Field Manual 3-11.4, *Multiservice Tactics, Techniques, and Procedures for Nuclear, Biological, and Chemical (NBC) Protection.* 2 June 2003

U.S. Code Title 10, *Armed Forces*

U.S. Code Title 32, *National Guard*

Professor Kievit is the Professor of National Security Leadership with the Operations and Gaming Division of the U.S. Army War College Center for Strategic Leadership. He graduated from the U.S. Military Academy and served more than 24 years as a Corps of Engineer officer in a variety of combat engineer and strategic analysis assignments. Professor Kievit holds master's degrees in history and in engineering construction management from the University of Michigan. He also holds a master's in military art and science from the U.S. Army School of Advanced Military Studies.

Mr. Auger is a defense consultant with Booz Allen Hamilton, Incorporated. He is a graduate of the U.S. Army War College and holds graduate degrees in history and international relations from the University of Scranton and the University of Southern California, respectively. His more than 28 years of military service culminated in the position of director of the Chief of Staff of the Army Strategic Outreach Initiative.

Letters to the Editor

The *Army Chemical Review* welcomes letters from readers. If you have a comment concerning an article we have published or would like to express your point of view on another subject of interest to chemical soldiers, let us hear from you. Your letter must include your complete address and a telephone number. All letters are subject to editing for reasons of space or clarity.

Our mailing and e-mail addresses are—

Army Chemical Review
320 MANSCEN Loop, Suite 210
Fort Leonard Wood, Missouri 65473-8929
<pbd@wood.army.mil>

The Changing Face of Biological Warfare Defense

By Mr. Al Mauroni

Over the last two years, discussions on biological warfare (BW) defense inside the Beltway have taken on an increasingly strident tone. These discussions, initiated by the Office of the Secretary of Defense (OSD) for Counterproliferation (CP) Policy and echoed by the National Defense University's Center for CP Research and other critics, propose that the military services have incorrectly addressed BW defense since Operation Desert Storm. Specifically, the charge has been that the military services had adopted a "chem-centric" view of BW defense, instead of appreciating and addressing the unique aspects of the BW challenge.

As the Joint Service Installation Pilot Project (JSIPP) continues to field chemical and biological detectors at nine military installations during early 2004, the question of how to best employ biological detection assets at installations that do not have the manpower or resources to sustain 24-hour, 7-day coverage is still unclear. The Defense Planning Guidance released in April 2002 directed the Chairman of the Joint Chiefs of Staff (CJCS) to review the need to develop and promulgate a joint concept of operations plan (CONPLAN) for the BW defense of joint task forces and fixed sites. Meanwhile, the Air Force and the Navy have invested considerable resources in developing their own service concept of operations (CONOPS) for BW defense. This all leads to one major question—are we doing something wrong today? What new insights or data have emerged that led these critics to believe that our military forces have a flawed approach to conducting BW defense?

The argument that many military analysts view the execution of chemical and biological defense similarly has a ring of truth to it. Certainly, we all say the words "chemical and biological defense" often and very easily, perhaps without appreciation that they are two distinct operations. There has been an intellectual laziness in the sense that many people feel that future detectors should sense chemical and biological hazards simultaneously, as we develop protective equipment, protective shelters, and decontaminants designed to also counter chemical and biological agent effects simultaneously. Modernization plans call for integrated chemical and biological sensor platforms and the fielding of thousands of tactical-level biological detectors, without considering the fact that biological agents have different hazard footprints than chemical agents or that the cost of fielding tactical detectors may outweigh the immediate benefits. It is this evidence that causes some critics to point out that the military does not appreciate the very distinct physical properties and effects of chemical agents (quick-acting, tactical weapons) versus biological agents (slow-acting, theater-level weapons). Toxins—chemical agents produced by biological organisms (such as the botulinum toxin)—further blur the distinction between chemical and biological agents.

> *"…biological agents have different hazard footprints than chemical agents..."*

Conversely, while chemical and biological agents have different physical properties and effects, they do have similar employment properties. Chemical and biological weapons are two sides of the same coin: they both originate from the field of natural sciences and are employed on the modern battlefield, and they both harm humans and animals based on their inherent interactions with living matter, generally attacking through the skin and respiratory tract (as opposed to explosives or piercing weapons). They are delivered by similar weapon systems: artillery projectiles, aerial bombs, aerial and ground aerosol sprayers, ballistic missiles, and even hand grenades, as well as through covert operations using small amounts against individual targets. Most chemical

"Chemical and biological weapons are two sides of the same coin: they both originate from the field of natural sciences and are employed on the modern battlefield, and they both harm humans and animals based on their inherent interactions with living matter, . . ."

and biological agents are largely invisible to the naked eye and have little or no odor; they can both cause mass casualties quickly if disseminated in large quantities over large areas. Both chemical and biological weapons provide an unconventional capability of demoralizing, diminishing, or destroying a military force that is unprepared for their effects. Because chemical and biological weapons share a common scientific kinship and both use similar weapon systems to target people, there is a common defensive approach to facing these weapons.

What Is Not New

Critics offer that the military services focus too much on the detection of biological hazards through automated sensors as a means to protect against exposure, noting that technology does not permit a "detect-to-warn" capability. A main concern was that by treating BW defense as a "subset" of nuclear, biological, and chemical (NBC) defense, the military was arbitrarily limiting its procedures and doctrine, thus limiting its overall defensive capabilities. Despite years of demonstrated experience, especially following the Gulf War, Army subject matter experts could not convince their critics that they had an effective biological defense strategy. Current biological detectors will not prevent personnel from being exposed to biological agents, but they do provide a warning that allows enough time for effective medical countermeasures. Due to this perceived shortcoming, the OSD and other critics suggested that military forces migrate from an "avoid, protect, and decontaminate" concept to a "monitor, mitigate, and respond" concept.

The assumptions of this alternative concept include the argument that biological agents take longer to affect personnel than chemical agents, that biological detectors are too slow and too few (due to their expense) to rely upon, and that initial symptoms of an unannounced attack will be indistinguishable from the background of naturally occurring diseases until too late. The key to countering unannounced BW attacks against military targets was, in this concept, meteorological monitoring, medical surveillance, and proactive countermeasures. The new tactics, techniques, and procedures would rely on *monitoring* the weather and threat conditions for increased opportunities of terrorist attacks, in addition to medical monitoring of the population. The population at risk would *mitigate* the possibility of exposure during this period of increased threat through the use of "half masks" until the threat period was over (much like is done to protect against severe acute respiratory syndrome [SARS] in many parts of the world), while exposed personnel would promptly receive postexposure medical countermeasures. The *response* portion would be a collaborative, interagency (federal and state) and/or host nation response force supporting base recovery operations and initiating investigations to identify the attack perpetrator.

When this concept was proposed to the Joint Staff and the military services, the cautious response was "Why are we replacing 'avoid, detect, protect' with a new slogan that essentially means the same thing? We already do all these tasks in this proposal, except for using the half masks." The Joint Staff and the military services did not see the need to adopt a new and distinct CONOPS for BW defense, and they especially did not see the need to rewrite Joint Publication (JP) 3-11, *Joint Doctrine for Operations in Nuclear, Biological, and Chemical (NBC) Environments*, which was the intended implementation vehicle for the new concept. What these critics had not understood was that their perspective was focused on a unique scenario of a BW terrorist attack against a domestic (within the continental United States [CONUS]) military installation with an unprotected, mostly civilian population. Instead, it argued that both scenarios (military warfighters facing an adversarial nation equipped with weaponized BW agents and domestic military installations facing a smaller-scale terrorist BW threat) required the same approach, one that was distinct from how forces currently deal with chemical or radiological contamination hazards. While certainly these critics had a point that military installations were vulnerable, that did not equate to a threat similar to that which a joint force undergoing military combat operations would face. Fundamentally, the critics had ignored the point that the threats from chemical and biological agents were so similar that it made sense to use similar doctrine, subject matter experts, and equipment to meet the wartime threat rather

than developing a separate, but parallel, set of doctrine, experts, and equipment.

The Institute of Defense Analyses (IDA) facilitated the development of the draft BW defense CONOPS, which is still undergoing staffing at the time of this writing. While it does not reflect the "monitor, mitigate, respond" philosophy, OSD representatives agreed with most of what it had to say, which, at the end of the effort, was not much different from past doctrine (although it did clarify specific BW defense capabilities and shortfalls). However, they were concerned that the proposed concept did not endorse the use of half masks, which was not seen as a very effective or viable option. Of interest is that the OSD leadership chose to initiate its emergency mask program prior to any service consensus or recommendations on the overall Department of Defense (DOD) policy on how to protect military and civilian personnel at critical military installations and facilities. The debates rage on.

What Is New

Another OSD initiative in the Defense Planning Guidance was the direction that DOD should field chemical and biological defense equipment to 600 military installations between fiscal years (FYs) 2004 and 2009. This point was pushed over objections that the JSIPP would not have delivered any lessons learned on the fielding of similar equipment to nine installations in time to guide this effort and, more importantly, that fielding equipment to 100 installations per year could negatively impact the fielding of critical equipment to warfighting units. Upon reflection, in the summer of 2002, the number of bases to receive equipment was reduced to 200 (over 6 years), with a plan to start with 15 in FY04 and ramp up to 50 in FY09. OSD estimated that it would take approximately one billion dollars to address the requirements of those 200 installations, using the estimates derived from very rough and unrefined calculations developed by a joint service working group in November 2001.The funding was taken from military antiterrorism efforts, traditionally focused on conventional (other than chemical or biological agent) terrorist threats. It should not be a surprise that the big-ticket item in these calculations was the employment of biological detectors and medical-diagnosis tools at each installation.

The question that remains unanswered is: How will installation commanders execute BW defense, given that, while the population is vulnerable, the risk of terrorists using biological agents is not as likely as their using conventional weapons? Given that there are little to no resources to operate and sustain this equipment, how are installation commanders to maintain a viable chemical and biological defense throughout the year? This question was presented to the CJCS to answer by June of this year. The other looming question that remains unanswered is: What is the DOD policy for physically protecting personnel, other than U.S. forces (government civilians, contractors, military dependents), against chemical and biological hazards? This question has remained unanswered since asked by the Vice Chief of Staff of the Army, General John Keane, in November 2001. On 5 September 2002, the Deputy Secretary of Defense released a memorandum stating that all personnel working or living on a military installation, CONUS or outside the continental United States (OCONUS), would receive appropriate protection. Exactly what the term "appropriate protection" means in terms of implementation concepts and equipment is still being developed.

Operation Iraqi Freedom caused the military services to look hard at their BW defense operations and, in some cases, come up with new CONOPS. The Air Force has a BW defense working group examining the development of a CONOPS unique to air base protection. Each branch of the military service has developed tactical concepts for employing dry filter units (air samplers) for force protection, in addition to supporting military operations. The Navy, in particular, developed biological sampling protocols to ensure that their fleet and shore-based forces could collect, sample, and diagnose potential BW hazards as quickly as possible. And the Army Biological Integrated Detection System (BIDS) platoons, as well as the U.S. Army Technical Escort Unit and a theater Army medical laboratory, deployed to the Middle East to support operations.

Recent operations have provided a great deal of data to the Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear (CBRN) Defense, which has the task to develop the DOD BW CONOPS, the installation protection CONOPS, and an overarching CBRN defense architecture. The basis for all three of these ideas is the "sense, shape, shield, and sustain" joint philosophy first identified by the U.S. Army Chemical School in 1999 and disseminated as "Chemical Vision 2010." While not differing greatly from the "avoid, protect, and decontaminate" philosophy, it does allow for a more simultaneous and continuous execution of the principles of CBRN defense based on the need

for information superiority than what some have identified as a chem-centric linear and detection-based philosophy.

Implications for the Future

This author will not attempt to forecast how these CONOPS will mature over the next year. The debate on how the military services perform BW defense will go on, if not intensify, due to the lack of any recent biological incidents (since the October 2001 letters). It is my belief that the overwhelming majority of military specialists within the DOD chemical and biological defense program instinctively recognize that the effects of biological agents are distinct and different from chemical agents, just as much as they recognize that the employment of biological agents and the defense against them are very similar in principle to the employment of and defense against chemical agents. It is a question of detail and the exact tactics, techniques, and procedures that make the difference. Despite the very real concern over the possibility of biological agent use, no one has suggested that the employment of BW detectors is not a positive first step for warning or that the military should rely solely on half masks for protection in lieu of detectors.

Still, OSD has made a point about how the nonspecialists might view BW operations. Getting military leaders, other than chemical and biological specialists, to recognize the threat of chemical agents was tough enough in the 1980s and 1990s; now a similar reeducation has had to take place to recognize how we should deal with biological agent threats, given the limitations of detectors, the shortage of vaccines, and the wide variety of incubation periods and effects of various biological agents. Consider that chemical and biological specialists have concurrence that future military forces should develop a Joint Biological Tactical Detection System (JBTDS), which could number as many as 30,000 to 40,000 units (similar to the current density of chemical agent alarms). The question no one wants to answer is where are all of the collected samples going to go for testing. Certainly the Army, Air Force, and Navy, together with their forward medical laboratories, have trouble dealing with the current load of samples, let alone increasing that load. What is clear is that the critical concerns of a detector-centric BW defense approach are valid and could be a step in the wrong direction—not because detection of the hazard is not feasible, but because there are not enough laboratory facilities to process all these samples in a timely fashion. No one has adequately addressed this future challenge.

The medical community has a unique set of requirements for BW agent defense in terms of processes and what one does with the information gathered—a discussion that often becomes clouded with operational concerns. The need for a common approach to operations and medical diagnoses that are both reasonable to maintain and enable force health protection is an issue with homeland security (HLS) as much as it is with warfighting and installation protection. It may be that a simplified table (as shown in the table below) can outline how the military, as well as agencies involved with HLS, address future BW defense concepts. This table is valuable in explaining why there is such a cacophony when talks about BW defense occur. In a very real sense, there are three different customers for BW defense information, which has resulted in the need for three different levels of confirming if biological agents have been employed. Commanders need to know when they are attacked and with what so they can make immediate operational decisions—decisions other than required medical measures. They do not need a sampler in tactical detectors, a requirement that could be costly and an operational impairment. It is the medical specialists that need samples from the immediate hazard area—samples that can be verified by Food and Drug Administration-approved methods,

Biological Warfare Defense Information Requirements

Biological Warfare Terminology	Who	What	Where	When	How
Presumptive	Commanders	Information to act	Tactical	Within minutes to hours	Reasonable confidence
Confirmatory	Medical specialists	Information to treat	Operational	Within 1-3 days	Federal Drug Administration standards
Definitive	President and Secretary of Defense	Information to retaliate	Strategic	Within 1-3 weeks	International standards

allowing for medical treatment. Chain-of-custody sampling in laboratories in the United States and the United Kingdom is required so the President and the Secretary of Defense can be informed when there is no doubt as to the nature of a biological attack. This allows them to make decisions regarding retaliation. Discussing BW defense concepts can be very confusing for this very reason. While all these different discussions are going on, it is up to the military subject matter experts to initiate specific BW defense measures based on information from all three data collections. When the community can agree on a common approach and shed the confusing discussion of the laboratory labeling of "silver standards," "gold standards," and even "platinum standards" with operational information that commanders require, then real communication can take place.

The mistake we need to avoid is assuming that one detector system must address all information requirements. The primary reason we have the Joint Biological Point Detection System (JBPDS) fielded at the operational level is because science and technology could not make it small enough or inexpensive enough for tactical employment. Because it is at the operational level, its sampling capability provides confirmatory data to initiate medical decisions, not a commander's decision cycle. The initial JBPDS warning that it is taking a potential BW sample should be enough information for a commander to take action. One should not assume that future tactical detectors should merely be smaller JBPDS sensors supporting both command decisions and medical diagnosis. Otherwise, we will end up with a large number of expensive sensors flooding the theater medical labs with thousands of samples that technicians will not be able to address quickly. More likely, we need tactical detectors that do not take samples but merely provide early warning that a potential BW agent is present, much like our current chemical detectors do.

Summary

Many defense agencies and think tanks are discussing BW defense concepts, more so because of the greater perception of BW threats to military and civilian targets within CONUS rather than any recognition that the actual BW threat has changed. The military should review its CONOPS because the future battlefields are changing and new missions are emerging. The National Security Strategy and the Joint Strategic Capability Plan discuss a new construct for future operational planning, the "1-4-2-1" construct—one homeland defense effort, four complex and/or lesser contingency operations, two "swiftly defeat the efforts" major combat operations, and one "win decisively" major combat operation. Add the recent concerns that CBRN defense standards need to be better integrated into force protection and installation preparedness, and one sees a very fluid and complex environment that is different from the relatively simple warfighting environment once planned during the Cold War.

DOD needs an overarching philosophy which recognizes that CBRN hazards are diverse and different but which also uses a common doctrinal construct—one that uses a trained and ready military organization with the appropriate tools and tactics to address unconventional threats. The very unique mission areas of passive defense, consequence management, force protection, and HLS require a common set of terms and leveraged technologies to address different mission requirements and to protect different populations. It would be nice to have just one set of capabilities and one set of equipment to address all of these threats under all mission areas, but this is not a realistic near-term (or even midterm) objective. We need to recognize the significantly different requirements in installation protection as opposed to warfighting, while recognizing the unique characteristics of chemical and biological hazards. We need to use a common approach and specialized equipment developed on similar technologies, but perhaps to different parameters and timelines.

Last, the military CBRN defense community needs to proactively lead this discussion. Many "experts" are fully engaged and will continue to shape this concept, with or without the involvement of military experts. If nothing else, this explosion in HLS concerns has created many ideas and energy—not all in the right direction. The military needs to maintain its equities while participating in the intellectual discussions taking place. To not participate means that these decisions are being made for the joint force instead of with it. We cannot afford the possible consequences of these decisions.

Al Mauroni is a senior policy analyst with Innovative Emergency Management, Incorporated, specializing in the areas of chemical and biological defense. A former U.S. Army chemical officer, Mr. Mauroni has more than 18 years of experience and has published numerous articles and four books, most recently *Chemical and Biological Warfare: A Reference Handbook*, by ABC-Clio, 2003.

The U.S. Army Chemical Corps—

An Expansion in Skills and Equipment Is Needed to Support Response to TIM/HAZMAT Release Incidents

By Major James Demyanovich

The skills of the U.S. Army Chemical Corps are beginning to expand from their long-established focus on Cold War-based nuclear, biological, and chemical (NBC) risk assessment and mitigation techniques. The expansion is now on the path of formally addressing and including toxic industrial material (TIM)/hazardous materials (HAZMAT) release events as militarily significant operational risks. TIM release hazards are typically much smaller in scope than the Cold War Era hazards posed by the massive NBC weapons attacks that were expected to strike the forces poised along the border of the former Iron Curtain. Unfortunately, individual TIM releases can occur almost anywhere that there is industrialization; hence, though TIM releases are potentially less impacting than traditional NBC attacks, their potential occurrence is widespread. TIM releases pose operational risks that require NBC defense soldiers to be competent in addressing TIM/HAZMAT releases in a military context, primarily by using civil first responder HAZMAT techniques.

Our most likely adversaries today may not have large stockpiles of NBC weapons or radiological materials or the intent or ability to use them to contaminate large areas. NBC weapons attacks may be very limited in scope and occurrence, if they occur at all. However, a state- or non-state-sponsored adversary may be forced to think creatively and use easy, "quasi-NBC" attack opportunities that are truly asymmetric. Quasi-NBC attacks may mean releasing toxic materials at existing industrial facilities or dispersing toxic materials that were obtained for use as weapons. These materials might be dangerous due to their chemical toxicity, biological infectivity, or radiological intensity and persistency. TIMs are more available for ready use than NBC weapons, and they are common in the industrial world, often existing in plain sight. The Chemical Corps must be positioned to respond with TIM/HAZMAT knowledge, skills, training, and equipment.

The Chemical Corps continues to be the resident expert in chemical, biological, and nuclear warfare defense for the Army. Recently, radiological weapons—those spreading radioactive contamination without a nuclear weapons yield—have emerged as credible concerns. Chemical Corps expertise and tactical force response to radiological weapons releases follow many of the same principles as those of responding to nuclear weapon yield fallout. However, radiological events are more like HAZMAT releases than nuclear detonations. These were straightforward and easily achieved expansions in doctrine, though not necessarily accompanied by a broad expansion of low-level radiation detection equipment. This has yet to fully occur, but it is in the process of occurring. That was, and is, the easy part.

In 2003, the Chemical School commandant began to expand the Corps instructional programs to address more common, and therefore more likely, quasi-NBC hazard environments posed by TIM/HAZMAT events. Historically, the training of chemical soldiers in low-level radiation and low-energy alpha particle contamination and TIM incidents was not widely conducted since the hazards were not considered militarily significant. In many ways, the process of elevating TIM releases to the status of militarily significant has begun. TIM/HAZMAT issues

An article by the same title was originally published in the Spring/Summer 2003 issue of NBC Report, published by the U.S. Army Nuclear and Chemical Agency. This is an updated version that reflects the integration of relevant HAZMAT first responder training into the U.S. Army Chemical School curricula.

must be addressed by expanding the military operational doctrine, training, and equipment to span the breadth of tactical and operational levels in the Army.

Deterrence Through Preparedness

Swift military response is a viable and often available option when responding to a state- or non-state-sponsored adversary's use of NBC weapons. Realistically, however, industrial facility or locally initiated industrial material release "accidents or incidents" will surely complicate and possibly nullify U.S. military options to attack a single adversary with a swift response. With some planning and dedication on the part of an adversary, those accidents or incidents can and will create significant and unexpected events that affect friendly operations.

... industrial facility or locally initiated industrial material release "accidents or incidents" will surely complicate and possibly nullify U.S. military options to attack a single adversary with a swift response.

Skills and equipment are sorely needed by chemical soldiers and all associated forces operating on or near TIM/HAZMAT industrial facilities and potential material release sites. Chemical soldiers must be prepared to address the command's TIM/HAZMAT concerns through continuous operational monitoring and evaluation—pre- and postrelease event. Friendly force TIM/HAZMAT risk assessments are then formulated along with establishing appropriate active and passive defense and response planning.

The Chemical Corps is beginning to invest time and resources in formalizing TIM/HAZMAT release event training and equipment acquisition. This effort must continue to increase in scope because there are civil HAZMAT processes and procedures that can be applied to military operations without significant invention by the Chemical Corps. Extensive civil first responder HAZMAT training, education, and equipment are available to the military right now.

The military need for civil HAZMAT response education is broad and includes HAZMAT responder training and HAZMAT incident command and control familiarization. The training levels are similar to the differences between NBC reconnaissance force missions and NBC center missions. The first deals with boots-on-the-ground incident response, and the second deals with using all sources of information to integrate (at command level) the command response to TIM/HAZMAT incidents.

Lastly, training must occur parallel with equipping these same trained forces with specialized HAZMAT equipment that may be unique but must be integrated into unit equipment sets.

TIM Release Threats as Real-World Operational Concerns

The entire category of TIM/HAZMAT release scenarios is reflective of a very present asymmetric attack means capable of producing operationally impacting hazards on friendly forces. As a reality, TIM facilities are known to exist in virtually every industrial area in the world, but little has been institutionally taught about them as a professional education topic in the Chemical Corps. Some believed that subject was to be executed by individual chemical soldiers as self-study. Thankfully, the Chemical Corps has begun—through educational efforts at the Chemical School—to become the commander's expert in TIM release events. This expertise is also required for chemical soldiers who have not had the benefit of the Chemical School's addition of TIM/HAZMAT training. In the balance, lives and credibility are on the line, and Corps-led formal education and expertise are required as part of the resident and nonresident educational opportunities.

TIM/HAZMAT: Threat or Reality?

Worldwide TIM/HAZMAT release incidents happen often and most go unnoticed. TIM release incidents are *not* significant events, with rare exceptions. Headlines only capture the big TIM release incidents. Russia's Chernobyl nuclear power reactor fire and destruction occurred in 1986 during a power system test. The Bhopal, India, industrial chemical release occurred because a disgruntled worker placed a small quantity of contamination in a chemical production tank and caused a chemical reaction and toxic release. The results were in the headlines. Thousands of people were permanently evacuated near Chernobyl. High-level radioactive contamination existed in many areas, and plumes of low-level contamination traveled downwind, across Europe, signaling the eventual entombment of the reactor. In India's incident, thousands died and many more were injured in a silent, killing fog that followed the wind.

However, does anyone recall hearing in recent years of the major chlorine release near Las Vegas, Nevada, that required large areas of evacuation due to *tons* of chlorine being released from a storage

facility? Not likely. That is because HAZMAT events of this type come and go with the evening news. How many times have you heard a radio or television news sound bite like this one? *At 8:37 a.m. today, a train with ten HAZMAT cars carrying hydrogen fluoride derailed in the vicinity of Anytown, USA, requiring twenty city blocks to be evacuated for four hours.* This headline gains little attention because civil first responders are trained and equipped to assess the situation properly, estimate the effects, determine the level of protection needed, and produce a hazard estimation of these incidents. The Chemical Corps must be (and will be with continued expansion into TIM/HAZMAT operations) the military expert in this field when it has a similar capability based on training, equipment, expertise, and confidence like that held by civil first responders.

Incorporating Civil First Responder Training Into the Chemical Corps Skill Set

The Chemical Corps can and must continue to review and take advantage of the TIM/HAZMAT operations knowledge that exists in the civil first responder community. In civil HAZMAT operations, TIM release expertise must be professionally obtained from programs of instruction that include course completion standards. HAZMAT first responder skill sets at varying levels of responsibility and action are clearly required by chemical soldiers. There are varying levels of training available to meet the needs of the members of the HAZMAT response force—from the first person on the scene to the person in charge of a civil HAZMAT response: the incident commander. Most notably, these varying levels of civil HAZMAT training may be available and further imported directly into the Chemical School and/or offered via distributed learning courses.

The Chemical Corps can and must continue to review and take advantage of the TIM/HAZMAT operations knowledge that exists in the civil first responder community.

Civil HAZMAT Incident Command

HAZMAT incident command in the United States uses a common basis in standardization among emergency responders. It has a specialized language and structure, but its way of organizing, controlling, and responding to HAZMAT scenes is clearly based on the military aspects of situational awareness, response planning, and asset command and control. It should be no surprise that fire and rescue units organize and operate much like military combat units, with their command posts, reconnaissance forces, commanders, decontamination stations, and casualty evacuation pipelines. However, civil methods and language of operations are often unique and must be understood by and familiar to chemical soldiers. The civil Incident Command System used by first responders makes the senior responding leader the incident commander, and that commander is in charge. Chemical soldiers are well positioned to be the military force command's expert, advising on military support to civil HAZMAT incidents. Chemical soldiers are the right individuals in staffs and headquarters to facilitate a military response to TIM/HAZMAT releases. The concept of response and responsibility for civil incident command must be understood by chemical soldiers in order to facilitate any military force response to a TIM/HAZMAT release incident.

U.S. military operations that occur outside the United States may occur in regions with an operating emergency response infrastructure. Again, chemical soldiers must be educated in the basics of HAZMAT incident response and command to be of value in planning for *any* military support to a TIM/HAZMAT incident. A clear understanding of U.S. civil HAZMAT response command structure clearly empowers chemical soldiers to recommend ways to maximize the U.S. force response, provide credible assistance in a given situation, and preserve the force protection of committed forces.

Civil HAZMAT Incident Training

The Department of Defense has published its own HAZMAT response guidelines for installation response that includes TIMs: Department of Defense Instruction 2000.18, *Department of Defense Installation Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive Emergency Response Guidelines*. Varying skills for HAZMAT response and an overview of the civil Incident Command System must be incorporated into chemical soldier training as much as possible.

One of many sources of managing HAZMAT training is described in a HAZMAT Emergency Preparedness Grant Program document entitled *Guidelines for Public Sector Hazardous Materials Training*. It describes the complex, though attainable, skills required to properly implement HAZMAT training and the levels of HAZMAT training. The document is intended to be a reference manual for training managers and public sector employers and is an excellent overview of HAZMAT training

requirements. Its introduction is available on the Internet at <*http://www.usfa.fema.gov/downloads/pdf/hmep/HMEPIntro.pdf*>.

Guidelines (as this document is known) is organized into subsections that address the broad, general training issues. It describes incident response and first responder awareness with detailed explanations of the roles, responsibilities, and capabilities of first responders, HAZMAT technicians, on-scene incident commanders, and about a dozen other HAZMAT emergency response special topics, including health worker and emergency medical concerns. The *Planning Curriculum Guidelines* section describes how to broaden the knowledge, skills, and attitudes of the broad spectrum of training personnel who are developing or contributing to the development of local HAZMAT response plans. As is clear, the civil first responder community has extensive requirements and training available to address TIM/HAZMAT incidents. Operationally, chemical soldiers must also continue to receive, at various grades, increased levels of this same TIM/HAZMAT training as part of institutional and continuing education.

Equipping Forces to Assess TIM/HAZMAT Releases

Training provides for proper assessment of possible or actual TIM/HAZMAT release incidents. Of critical importance are the "proper tools of the trade." Specialized detection, protection, decontamination, and hazard assessment equipment must be considered for augmentation to unit NBC defense equipment sets and the associated training. Much of the available equipment is ruggedized for firefighter/first responder use. Much of this equipment could be of great use in NBC defense equipment sets in units if it is acquired and trained on before it is needed as additional equipment. This requirement is especially important when contingency plan mission analyses of potential or likely operating areas—from garrison to the forward deployment areas—have significant TIM facility concerns.

Chemical Corps TIM/HAZMAT Release Skills

Chemical Corps HAZMAT expertise and fielding of specialized equipment are needed for adequate military force protection, detection, and decontamination in TIM release incidents. In the civil fire-fighting world, these are HAZMAT incidents. The civil fire-fighting world has training requirements as well as procedures for all who are involved in HAZMAT response, from the first responder conducting on-scene reconnaissance to the on-scene incident commander. These varying levels of expertise are required in the Chemical Corps. The civil fire-fighting HAZMAT response and control training programs can be the Chemical Corps's viable and tactically employable method of HAZMAT/TIM response and control.

Summary

There has been some growth in the Chemical Corps's technical TIM/HAZMAT training or materiel development and acquisition since the Cold War ended. A continued expansion of the Chemical Corps's competencies is required to assess and facilitate an appropriate response to TIM/HAZMAT threats and events. Future Chemical Corps TIM/HAZMAT expertise will complement the existing medical occupational safety and health operational background surveys that are given to assess and document the low levels of former TIM/HAZMAT/NBC materials in our deployment areas. Such training benefits all our forces serving at home and abroad. The expansion of training for all soldiers at the Chemical School has included, for the first time to my knowledge, HAZMAT training. Including this training is an appropriate start in educating our field forces to prepare for and respond to TIM/HAZMAT events. This is clearly due to our current threat environment and our adversaries' use of expedient means to create significant events with toxic materials that are much more available than are traditional NBC weapons and delivery systems.

References

Department of Defense Instruction 2000.18, *Department of Defense Installation Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive Response Guidelines,* 4 December 2002.

Hazardous Materials Emergency Preparedness Grant Program, *Guidelines for Public Sector Hazardous Materials Training,* March 1998.

Major Demyanovich is a chemical officer in the Defense Threat Reduction Agency Chemical/Biological Directorate's Transition Division. He holds a bachelor's in mechanical engineering from Pennsylvania State University and a master's in operations research from the Naval Postgraduate School.

Science and Technology in a Dynamic CBRN Landscape

By Mr. Victor Ellis

"If I had it to do over again, I'd have gone for the ports."

—Saddam Hussein (following Gulf War I)

Twenty-first century science and technology continue to evolve in joint efforts between military forces and commercial industry. In response to Joint Vision 2020's guidance on the continuing transformation of America's armed forces and the warning that future adversaries may pursue an asymmetric advantage by identifying key vulnerabilities to the United States and interests abroad,[1] the Army's Chemical Corps maintains caution while ever determined to achieve the technological edge required to mitigate chemical, biological, radiological, and nuclear (CBRN) acts of aggression. As terrorists seek to devise concepts and capabilities to strike or exploit their cause, procedural and technological enhancements in military and commercial equipment keep pace with global threat scenarios.

As Secretary of Defense Donald Rumsfeld wrote in his Annual Report to the President and Congress in 2003, "Future adversaries are seeking capabilities to render ineffective much of the current U.S. military's ability to project military power overseas. Today, U.S. power projection depends heavily on access to large overseas bases, airfields, and ports."

Joint Vision 2020 warns, "The potential of such asymmetric approaches is perhaps the most serious danger the U.S. faces in the immediate future..."[2] The vital importance of seaports of debarkation (SPODs) to U.S. power projection capability makes them an attractive target for a chemical-biological (CB) attack. As strategic choke points, their closure or reduced operational capability can significantly degrade the military capabilities of the United States in the event of a crisis. As such, SPODs in immature theaters are considered strategic centers of gravity requiring careful protection and commitment of resources to ensure that they are adequately protected and, if attacked, quickly restored to operation.

The ability to defend SPODs against CB, toxic industrial chemical (TIC), and toxic industrial material (TIM) attacks is an operational necessity for all unified combatant commands during power projection and force deployment operations. Most SPODs are controlled by host nation commercial or government entities and have little or no U.S. military or civilian presence and no pre-positioned CB defense equipment. This lack of personnel and equipment leaves SPODs vulnerable to CB, TIC, and TIM attacks during the initial phases of force projection operations. Therefore, the ability to protect against, immediately react to, and minimize the impact of a CB attack is critical to maintaining the flow of forces and materiel into any theater worldwide.[3]

The Defense Threat Reduction Agency's Advanced Concept Technology Demonstration (ACTD) for Contamination Avoidance at Sea Ports of Debarkation (CASPOD) addresses critical military needs for ensuring that our adversaries are not successful in denying U.S. forces access to seaports during power projection operations. To evaluate proposed solutions to meet military needs, intense user involvement is required. "ACTDs place mature technologies in the hands of the user and then conduct realistic and extensive military exercises to provide the user an opportunity to evaluate utility and gain experience with the capability. The process provides the users a basis for evaluating and refining their operational requirements, for developing a corresponding concept of operations (CONOPS), and ultimately for developing a sound understanding of the military utility of the proposed solution before a decision is made to enter into the formal acquisition process. Furthermore, a key objective of ACTDs is to provide a residual operational capability for the warfighter as an interim solution prior to procurement."[4]

The CASPOD ACTD explores innovative technologies and systems to protect operations at strategic transportation facilities. Advances in equipment focus on the identification of technologies that can be used prior to, during, and after an attack to mitigate the effects of a CB agent, TIC, or TIM on the force flow

and operating tempo during the initial stages of power projection operations at SPODs. The goal of the CASPOD ACTD is to identify, provide, and improve technologies, strategies, and tactics to mitigate the effects of these incidents through the following technological arenas:

- **Warning/Situational Awareness—**A networked system of detectors that can detect hazards and warn SPOD command centers, as well as combatant command joint operations centers.
- **Detection (Standoff) Equipment—**Detection equipment (CB, TIC, and TIM) that provides 360-degree standoff protection.
- **Individual Protective Equipment—**Inexpensive and easily donned or doffed individual protective ensembles for use by civilian host nation support personnel and other SPOD essential work force, as well as U.S. military personnel who may arrive without full individual protective equipment.
- **Collective Protection Shelters—**Easily erected or permanently installed collective protective shelters for SPOD command and control, medical support, and work or rest relief areas.
- **Decontamination Equipment—**Equipment and decontaminants necessary for the rapid decontamination or neutralization of CB agents, TICs, and TIMs on personnel, equipment, and large areas of terrain.

ACTDs "are sized and structured to provide clear evaluation of military capability. The user, with support from the operational test agencies, defines the measures of effectiveness and performance that allow effectiveness and suitability to be characterized. Data collection is tailored accordingly. The quantity of systems in the ACTD is sufficient to provide a valid assessment of the capability, or simulations are used to expand the battlespace and forces involved in the exercise. The user provides, or at least approves, the planned operational exercises which typically include red, as well as blue, forces."[5]

"Many ACTDs are based on advanced technologies which may permit, or even demand, new CONOPS, tactics, and doctrine in order to realize their maximum potential. The ACTD provides a means to develop, refine, and optimize these war-fighting concepts to achieve maximum utility and effectiveness. Each ACTD is managed by a lead service or agency developer and driven by the principal user sponsor. As a general rule, but not as a requirement, the user sponsor is usually a unified commander. The Joint Requirements Oversight Council (JROC) will make a recommendation to the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD AS&C) regarding the lead service and user sponsor as part of the JROC review of candidate ACTDs. All user and development organizations are represented on an oversight group, chaired by the DUSD AS&C. The purpose of this group of senior representatives is to provide a decision-making body that can respond quickly to significant program issues that require management direction or approval and to assure effective, timely communications among the leadership level of the key participating organizations."[6]

The U.S. Army Chemical School, having jointly partnered with the Defense Threat Reduction Agency on new equipment assessment, seeks a common goal to provide soldiers with an objective, reproducible, and adaptable means of effective formulation processes and other assessment methods for increasing existing defense capabilities. As both military forces and commercial industry's exploration into state-of-the-art technologies continue to evolve, strategies for developing measures of effectiveness and performance are continually being formulated to help assess new equipment technologies and improvements in training, doctrine, CONOPS, and leader development integration. The focal point for modernization is, and always will be, on an ever-increased operational war-fighting ability in order to provide measurable increases in existing defense capabilities, both at home and abroad.

Endnotes

[1]Joint Vision 2020, <*http://www.dtic.mil/jointvision/jvpub2.htm*> (12 January 2004).

[2]Ibid.

[3] Defense Threat Reduction Agency, "Contamination Avoidance at Sea Ports of Debarkation (CASPOD) Advanced Concept Technology Demonstration (ACTD)," 4 December 2002, <*http://www.dtra.mil/cb/caspod/cb_index.html*> (12 January 2004).

[4]Integrated Chemical and Biological Defense Research, Development and Acquisition Plan: Chemical & Biological Point Detection Decontamination Information Systems, April 2003, <*http://www.nti.org/e_research/official_docs/dod/2003/dod0403.pdf*> (12 January 2004).

[5]Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, Introduction to ACTDs, 7 May 2002, <*http://www.acq.osd.mil/actd/intro.htm*> (12 January 2004).

[6]Ibid.

Mr. Ellis is an instructional systems specialist at the U.S. Army Chemical School. He holds a bachelor's in English and education from Drury University.

American Gas Masks for American Soldiers —

Gas Mask Production in the World Wars

By Lieutenant Colonel Robert D. Walk

As the United States mobilized forces to deploy overseas during World War I and World War II, American leaders thought those forces should be outfitted with equipment, including gas masks, made in the United States. During World War I, the majority of U.S. forces were issued masks made in the United States; however, during World War II, all U.S. forces received them.

World War I

The United States was unprepared for the chemical warfare of World War I. When we declared war in 1917, we had no gas defense equipment on hand. On 21 May 1917, a rush order was placed for 25,000 masks to be shipped oversees to the First Division. These masks were based on the British small box respirator (SBR), the then standard British mask that used a noseclip and a mouthpiece. The medical department, then responsible for gas defense, turned to the Bureau of Mines for help with the mask design. When the design was completed in July 1917, production began in Boston, Massachusetts; Brooklyn, New York; and Akron, Ohio.[1] This was a national effort. Unfortunately, the masks were unacceptable and were sent back because the facepieces were easily penetrated by chloropicrin. U.S. forces stationed in France were then issued the British SBR and the French M2 mask.[2]

But more masks were needed to equip the American Expeditionary Force. The Gas Defense Service of the Surgeon General's Department (established 31 August 1917) was tasked to produce 1.1 million masks. The Hero Manufacturing Company,

Philadelphia, Pennsylvania, one of the numerous contractors and subcontractors hired by the Gas Defense Service, performed the final mask assembly.

During the war, improvements to the SBR's basic design were continual. The next mask produced and accepted for use by the American Expeditionary Force was the Corrected English (CE) mask. About 2 million CE masks were produced between June 1917 and March 1918. The CE mask was the same basic design as the SBR, with added improvements such as Triplex® safety glass for the eye lenses. This was the first major use of safety glass. Further improvements resulted in the development of the Richardson-Flory-Kops (RFK) mask. The RFK was used until the end of hostilities, with over 3 million produced. When World War I ended on 11 November 1918, 40,000 masks were being produced daily.[3]

Improvements in mask design eliminated the need for the noseclip and the mouthpiece. The improved wearability and vented air over the eye lenses eliminated fogging problems. The inspiration for this design change was the French Tissot mask, which was comfortable but bulky due to the large canister worn on the back and fragile due to its thin, natural-rubber facepiece. American designers adapted the French Tissot mask design to mass production. Improvements included adding fabric (stockinette) to the rubber sheets to strengthen the facepiece, attaching a standard infantry canister, and changing the outlet valve. Two models were adopted: the Kops-Tissot (KT) and the Akron-Tissot (AT) masks. The KT, designed by a former corset designer, had a production of 197,000 before the armistice and the AT mask, which used the RFK outlet, had a production of 291,000. The final design, using the best ideas from the AT and KT, was the Kops-Tissot-Monro (KTM) masks, of which 2,500 were produced before the armistice.[4] In all, 5,692,499 masks of all types were produced by the end of 1918.[5]

With five different masks (and 12 filter canisters) produced in less than 18 months, Chemical Warfare Service (CWS) leaders thought that changes to the mask design could be easily and quickly implemented if there was a government mask production plant. Mask production was not an easy task, because changes were constantly being made, so the CWS decided to centralize production. On 20 November 1917, the Secretary of War authorized the establishment of a gas defense plant in Long Island City, New York, which was run by Mr. R.R. Richardson, a dollar-a-year man. By the summer of 1918, the plant occupied five large buildings, totaling over 1 million square feet. There were 12,000 employees, of which 8,500 were women. To ensure extra care in manufacturing, Mr. Richardson hired workers who had relatives in the American Expeditionary Force, believing that they would take extra care in the production process. The plant workforce, which included both military and civilian personnel (a first in the war), was very efficient, producing masks for about 50 cents less than the Hero Manufacturing Company.[6] The total mask production was 3,666,683 by the Gas Defense Plant and 2,025,816 by the Hero Manufacturing Company.[7]

Interwar Years

By the end of World War I, the Army had decided on one standard gas mask—the KTM. Production was so efficient and improvements so quick that masks in the hands of soldiers were almost immediately obsolete. As a result, soldiers were allowed to keep their masks as a memento of their service.[8]

During the interwar years, production was transferred to Edgewood Arsenal, Maryland, and mask production was continued on a limited basis. Funding was scarce, but research continued, and by 1938 an injection-molded mask had been successfully developed. The KTM was redesignated the MI Service Gas Mask and was further modified and improved to become the MIA2 mask. The blue filter canister of 1918 was further refined through stages until the MIX became the standard in 1938.[9] The MI service gas mask was the mask for general issue to all soldiers not otherwise authorized a special type of mask. Other special mask designs included a diaphragm mask for soldiers needing to communicate and an optical mask for soldiers needing to use optical instruments.

In an attempt to solve the mobilization problems encountered during World War I, the Army planned production requirements based on future mobilization needs. The plan called for the mobilization of 400,000 soldiers (Army and National Guard) within 30 days, 1 million soldiers within 4 months, and a peak of 4 million soldiers within 14 months. In 1924, to facilitate production, five procurement districts were set up: New York, Boston, Pittsburgh, Chicago, and San Francisco.[10] As Edgewood Arsenal had limited capability for expansion, CWS planners knew that production would have to be expanded to fully equip a wartime army. By the early 1930s, CWS planners were already planning to contract out production to civilian firms to produce up to 900,000 masks a month.[11]

At the start of World War II, the gas mask situation was much improved from that of 1917. In 1939, the United States had a standard service mask, the MIA2; a standard training mask, the MI (later redesignated M2); experience in mask production; and plans to expand production rapidly. Specifications and

blueprints to produce masks were also on hand.[12] On 26 October 1939, the CWS had 523,761 service masks on hand with an additional 227,836 on order (based on a projected need of 1,298,085). Of the 547,000 training masks required, the CWS had 34,000 on hand, with none on order.[13]

World War II

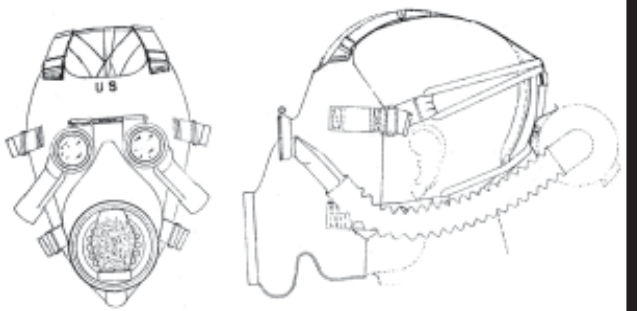
The first service mask produced in quantity for U.S. forces during World War II was the MIA2. It was a big improvement to the World War I design, which featured a facepiece cut from flat stockinette, covered with rubber sheets, and painstakingly assembled by hand and a chin seam cemented, taped, and vulcanized (baked). The filter was attached to the facepiece with a 27-inch hose. The training mask, the M2A1, was a seamless, molded, rubber mask with a front-mounted filter canister. The M2A1 was quickly adapted for mass production.[14]

To expand the technical knowledge of mask production, the CWS was funded to support educational contracts. These small contracts were designed to give businesses experience in mask production, while keeping the bulk of production at the Edgewood Arsenal. The first educational contract went to the Goodyear Tire and Rubber Company® in 1939 for the production of 3,000 masks. Workers from Edgewood Arsenal—technically skilled at mask production—provided their expertise to the businesses, and many remained as technical inspectors.[15] Other educational orders went to the Firestone Tire and Rubber Company® and Johnson & Johnson Company® for 10,000 masks each. The educational contract program was completed in 1941.

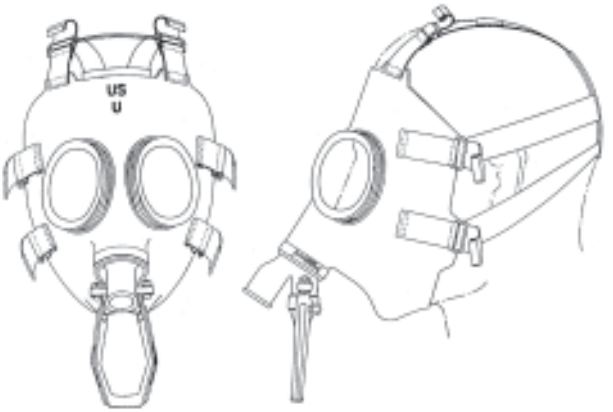
With funding finally approved, all service mask production shifted to the improved M2A1.[16] Full-scale production of the fully molded M2A1 began in late 1940, with additional technical difficulties resolved, and the redesigned mask used the same facepiece as the training mask.

The M2 mask was a technically outstanding mask but was heavy (about 5 pounds), bulky, and inconvenient. After improvements in the charcoal, the CWS designed a new mask—the M3 lightweight service mask. This new mask had a shorter hose and a smaller canister (the M10), yet it provided almost the same protection as the M2 mask and weighed only 3 1/2 pounds.[17] This mask was quickly adopted, and by the end of 1943, it had replaced the M2 mask in production. Initial M3 facepiece production problems led to the adoption of the M4 lightweight gas mask, an M2 facepiece overhauled and assembled with lightweight mask parts (filter, hose, and carrier). M4 production started in 1944.

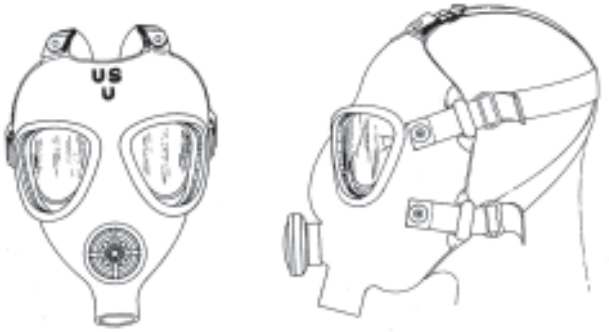
First injection molded mask



Experimental optical gas mask



MIA2 service gas mask



M2A2 service and training mask

Mask Production During World War II

Production Year	Service Mask	Combat and Snout Mask	Optical Mask	Lightweight Mask	Diaphragm Mask
1938	18,734				
1940	315,218				
1941	2,272,912		116,689		1,173,600
1942	3,929,552		11	12	356,983
1943	3,955,927	1,282		4,395,142	882,015
1944		517,221	90,844	6,078,825	
1945		313,685		2,572,430	
Total	10,492,343	832,188	207,544	13,046,409	2,412,598

Despite the superior products, soldiers in the field wanted a still lighter mask. Jungle fighters and paratroopers used the M2 training gas mask instead of their M2 service gas masks due to the lighter weight and compactness.[18] By 1942, the CWS had created a laboratory at the Massachusetts Institute of Technology in Boston, Massachusetts. They examined the problem and conducted a series of tests, determining that a cheek-mounted canister was the best answer, thus ultimately designing the M5-series mask. The M5 assault gas mask used a modified M3 facepiece with a cheek-mounted M11 canister and was made of neoprene. Production started and stopped in 1944 due to problems with the molding of the facepiece and its tendency to become rigid in cold weather. To provide a quick replacement for the M5 assault gas mask, the CWS adopted the M8 snout-type gas mask as an interim standard article. This mask was an M2 or M3 facepiece with an adapter installed to accommodate the M11 chin-mounted canister. All of these masks were produced in 1945.

Conclusion

During World War II, the CWS manufactured almost 27 million gas masks for soldiers. They planned for mobilization before the start of the war and then adapted as necessary to produce the mask the Army wanted. During World War I, commercial firms produced some masks, but more were produced at the government plant. During World War II, more than 90 percent of the masks produced were by commercial firms. The CWS instituted lessons learned from their World War I experience and put mask production in the hands of commercial firms.

Endnotes

[1] Benedict Crowell, *America's Munitions*, Washington, D.C.: Government Printing Office, 1919, p. 417.

[2] "The Chemical Warfare Service: From Laboratory to Field," U.S. Army, Center of Military History, Washington D.C., 1959, pp. 19-20.

[3] Robert D. Walk, "Mask History—Infantry or General-Purpose Mask," *Army Chemical Review*, February 2001, p. 24.

[4] Ibid., pp. 24-25.

[5] Crowell, p. 431.

[6] Ibid., pp. 426-427.

[7] Ibid., p. 429.

[8] Chief of Chemical Warfare Service, American Expeditionary Forces, Memorandum, Subject: Warning to Troops, 20 December 1918.

[9] Chemical Warfare Technical Committee (CWTC) Conference Number 1, Item Number 1, "Canister, Service, MIX, and Mask; Gas, Service, MIA2-IX-IIIA1—Subcommittee Report on Standardization," 2 February 1937.

[10] "The Chemical Warfare Service: From Laboratory to Field," U.S. Army, Center of Military History, Washington, D.C., 1959, p. 230.

[11] Ibid., p. 314.

[12] Ibid., p. 233.

[13] Office of the Assistant Secretary of War Statistics Branch, "Statistical Report Number C-17-40," 26 October 1939, *<http://www.fdrlibrary.marist.edu/psf/box6/a71a08.html>*, (3 February 2003).

[14] "The Chemical Warfare Service: From Laboratory to Field," U. S. Army, Center of Military History, Washington D.C., 1959, p. 316.

[15] Ibid., p. 315.

[16] Ibid., pp. 316-317.

[17] Ibid., pp. 81-82.

[18] Walk, p. 25.

References

The following images are used as references: Chemical Warfare Service Specification Sheets C5-2-76, 2 March 1933; C5-2-211, 22 December 1937; C5-2-38, 23 April 1929; C5-2-207, 13 October 1937; and C5-2-401, 28 December 1941.

Lieutenant Colonel Walk is an Active Reserve chemical officer currently assigned to The Army G8. He is a graduate of the U.S. Army War College, U.S. Army Command and General Staff College, and the U.S. Army Chemical School. He has held commands at the detachment, company, and battalion levels. Lieutenant Colonel Walk is a qualified hazardous materials technician and a Pennsylvania Essentials trained firefighter.

Ricin Toxin: A Military History

By Mr. Reid Kirby

Since the late 1980s, there has been a growing concern that terrorists might adopt chemical and biological weapons. Ricin (Agent W)[1]—due to its simplicity in extraction, availability of materials, toxicity, and a few would-be attempts to acquire it—has been a prominent counterterrorism concern. This concern stems mostly from the toxicity of ricin and partially from its little-understood military history.

Origins

The source of ricin, the castor bean, has been a well-known poison since ancient times. Ingesting two to four seeds induces nausea, muscle spasms, and purgation—eight seeds leads to convulsions and death. Castor oil (which makes up over half the weight of these seeds) has been used in ancient India, Egypt, and China as a cathartic and to treat sores and abscesses. Today, castor oil is an important industrial feedstock for numerous manufacturing processes and also is used as a lubricant and a laxative.

The castor bean plant (*ricinus communis*) is a 4- to 12-foot shrublike herb originating in Southeast Africa, but it has a worldwide distribution. It is cultivated throughout the United States as an ornamental plant. Carl Linnaeus, the 18th century botanist, derived the plant's taxonomic name from the Latin word *ricinus* (tick) because of the appearance of its seeds and the word *communis* (common) for its distribution. The term ricin was coined in 1888 by Herman Stillmark to name the toxic proteinaceous substance he extracted from the castor bean for his agglutination experiments.[2] This plant holotoxin was later used in Paul Ehrlich's famous immunology experiments.

***Ricinus communis*, the castor bean plant**

As a tool in science, ricin has contributed to early immunology, the treatment of cancer, and the understanding of cell biology. Its military history began during World War I as America's first venture into biological warfare, but ricin faded into obscurity after World War II when it was surpassed by the much more potent botulinum toxin A (Agent X)[3]. Eventually, ricin would gain notoriety as an espionage tool of assassination and would often be mentioned by potential terrorists. This brief military history of ricin illustrates the synergy required for a workable weapon system and the ethical issues it posed. Ricin proved difficult to weaponize for an aerosol effect, and where it was not difficult to weaponize, it represented an ethical dilemma.

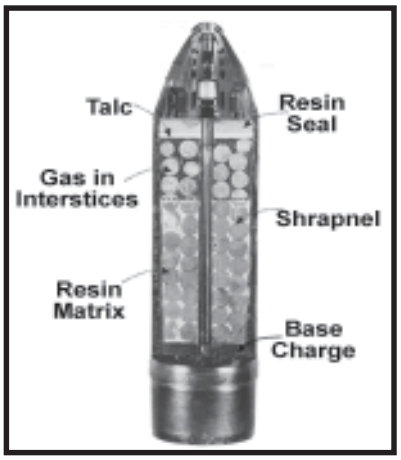
World War I

During World War I, the U.S. Bureau of Mines studied the offensive potential of ricin at the American University Experimental Station. Two weapon

concepts were considered: the simplest approach was coating shrapnel and bullets with ricin to create a skin effect; the more challenging concept was a "dust cloud" that produced a lung effect. At the time, limited experimental work on animals demonstrated that it was possible to weaponize ricin. Interestingly, the average time it took for an animal to die was somewhat longer than is reported in contemporary studies. This early work also identified the main technical difficulty in weaponizing ricin: its thermal sensitivity. It was found that the heat generated while firing the coated bullets destroyed a significant amount of the agent.[4]

The recommendation at the time was to investigate ricin-coated shrapnel or bullets immediately but hold off on a dust cloud weapon until an antitoxin could be made available. This posed the ethical dilemma mentioned earlier: a lung effect from ricin was an acceptable form of chemical warfare, but ricin-coated shrapnel and bullets were considered to be an act of poisoning and thus were ethically prohibited.[5] Ricin-coated shrapnel and bullets were only to be used in retaliation *(lex talionis,* the law of retaliation) against the Germans if they used a similar "poisoned" weapon.

By the end of the war, researchers could only weaponize ricin in coated shrapnel and bullets or by using a dust cloud for a blinding-eye effect[6] (the lung effect from a dust cloud could not be confirmed). Though four manufacturers had been identified and the U.S. Army desired to have three field trials with ricin, time and ethics prevailed, and the war ended without a usable weapon. Given its atrocious reputation, researchers felt that all records on ricin should be kept secret or destroyed.[7]



Cutaway of a 75-millimeter shrapnel shell intended to deliver a dry-type agent (probably a vomiting agent).

World War II

Early in World War II, England and Canada began work on ricin for use in 4-pound bursting bomblets.[8] The French also had an interest in ricin but, like early U.S. investigators, felt that it was too dangerous to study without first having an antitoxin.[9] The U.S. military's interest in ricin resurfaced around 1942 as a project of the National Defense Research Committee[10] and led to chamber and field trials at Dugway Proving Ground, Utah, in 1944.[11] These efforts differed from those of the previous war in that only a lung effect was being considered, and considerable advances had been made in the science of aerosols.[12] However, the thermal sensitivity of ricin remained the major technical hurdle.

Theoretically, there is about 1 gram of pure ricin per kilogram of cold-pressed castor bean cake. Given the U.S. production of castor oil during the war, 1,000 tons of ricin could have been produced annually. The agent's most basic form was an amorphous mass termed "crude" ricin, and it was essentially the form with which World War I investigators had worked. To get the agent into this usable aerosol form, it needed to be added to a volatile solvent (fluidized) or milled into a fine powder (micropulverized).

Fluidization was successful, but it seriously diluted the amount of agent that could be employed. Micropulverization of a dry-type agent was the preferred method, and ball milling (the common method of the time) was used first. During the milling, the heat from the friction was too extreme, and the agent was almost entirely destroyed, so an alternate method of milling and drying had to be developed. Spray-drying the agent and using a specially designed chilled-air grinder produced an agent that had lost little toxicity. This was the formulation that was termed *Agent W* throughout field trials.

There were three field trials at Dugway Proving Ground in May 1944. Two used a bursting munition resembling the standard 4-pound biological bomblet, and another used a tail-ejecting spraying munition. The tests were conducted in the G-2 Canyon Test Site on the northern slope of Granite Peak. Katabatic winds blew the aerosol cloud over 50, 100, 200, and 400 sampling arcs. The trials indicated that ricin was only lethal as long as the cloud was still visible to the unaided eye.

A pilot manufacturing plant produced 1,700 kilograms of ricin. Planners designed a $127,000 full-scale plant for producing micropulverized crude ricin, which

would have been capable of producing 26 pounds of agent a day at $13 a pound (in 1944). Between 1943 and 1944, a crystallization method was also developed that produced a more potent agent. It has been suggested that there were field trials with the crystallized agent after 1944, but the documentation supporting this has not been located.

Despite being successfully weaponized during World War II, the United States did not adopt ricin. Being a delayed-action nonpersistent lung agent, it offered little tactical advantage over existing agents. Its higher potency made it marginally better, but it was surpassed by the even more potent biologicals of the time. The military history of ricin ended without it ever being used on the battlefield.

Contemporary Events

Unlike during World War I and World War II, when today's military researchers work with ricin, they focus on detecting it, protecting the forces from it, and treating its effects. The prospects of the agent being used on the battlefield seem remote; however, it has been used in espionage for assassinations, and would-be terrorists have been caught in the act of acquiring it.

For example, two Bulgarian exiles were attacked in 1978. One, Georgi Markov, lived in London and died from mysterious circumstances. The other, Vladimir Kostov, lived in Paris and survived after doctors removed a small pellet from his back. A laboratory analysis identified the pellet as a carrier for ricin. According to Kostov, the pellet must have been discharged from a dart gun disguised as an umbrella. There may have been at least six assassination attempts by this method.[13]

Today there are numerous how-to books that claim to provide readers with the methods of obtaining ricin for terrorist uses. There have been cases of people trying to acquire it for use in terrorism. Small quantities (less than a kilogram) have been found in police raids. It does not appear that terrorists are mastering the technology needed to make ricin an effective weapon, but their preoccupation is inherently dangerous.

Endnotes

[1]The military assigned the letter W to ricin during World War II.

[2]Herman Stillmark, *"Ueber Rizin, ein giffiges Ferment aus dem Samen von Ricinlis commurris L. und einigen anderen Euphorbiaceen,"* Inaug. Diss Dorpat, 1888.

[3]The military assigned the letters XR after World War II.

[4]R. R. Williams, *Final Report on Ricin, Report #OM347.4*, Offensive Chemical Research Division, Bureau of Mines, American University Experimental Station, Washington, D.C., 30 April 1918.

[5] Traditionally, there has been an ethical distinction between chemical and biological warfare and poisoning. A more complete description of this distinction can be found in a book by R. M. Price, *The Chemical Weapons Taboo*, Cornell University Press, 1997.

[6]At the time, this blindness was probably assumed to be permanent, but contemporary animal experiments note only temporary eye effects.

[7]Personal letter from R. Hunt (Harvard Medical School Department of Pharmacology) to Major C. J. West, 18 March 1919.

[8]These investigations included field trials at the Defense Research Establishment Suffield at Ralston, Alberta (Canada), and did not exceed the development efforts of the United States.

[9]S. M. Whitby, *Biological Warfare Against Crops*, Palgrave Macmillan, 2002, p. 81.

[10]A. C. Cope, J. Dee, and R. K. Cannan, Chapter 12, "Ricin," in B. Renshaw (ed), *Summary Technical Report of Division 9*, Vol. 1, PB 158507-8, National Defense Research Committee, 1946.

[11]D. T. Parker, A. C. Parker, and C. K. Ramachandran, Part 3, "Ricin," in *Joint CB Technical Data Source Book*, Vol. IV, Joint Contact Point Directorate, U.S. Army Dugway Proving Ground, Utah, 1996.

[12]Aerosols were a technical problem that eluded the researchers of World War I.

[13]Joseph D. Douglas, Jr. and Neil C. Livingston, *America the Vulnerable: The Threat of Chemical and Biological Warfare*, Lexington Books, Lexington, Massachusetts, 1987, pp. 84-85.

Mr. Kirby has more than 15 years of study in the field of chemical-biological warfare history. He is a subject matter expert who consults for the U.S. Army Chemical Corps Museum and the History Office, both located at Fort Leonard Wood, Missouri.

Men of Dog Company man a 4.2-inch chemical mortar somewhere in France, 1944.

"We Did Not Feel We Were Heroes"

The 81st Chemical Mortar Battalion (Motorized) on Omaha Beach, 6 June 1944

By Mr. Kip A. Lindberg

The greatness of a nation cannot be measured simply by the percentage of the globe its territory occupies, or by its gross national product. True greatness can be found in the strength and character of its people, and since the birth of this Republic, we as a people have chosen to recognize those among us who, despite hardship, have performed their duty above and beyond expectation. Across the United States—in town squares, on public buildings, and in peaceful cemeteries—monuments stand to these individuals. More than mere decorations, these memorials serve as an inspiration to us all. They represent dedication to a cause and commitment to the preservation of our ideals of liberty and illustrate all too well that our freedom has been purchased with patriot blood.

However, there are monuments that, while just as inspiring, are not made of marble and bronze but rather of faded ink and brittle paper. In the archives of the U.S. Army Chemical School, we recently found several boxes of documents and photographs relating to the 81st Chemical Battalion (Motorized)[1] and its service in World War II. Among the newspaper clippings and reunion photos were two first-person accounts of the assault on Omaha Beach on 6 June 1944.

First Lieutenant Dave Frankel and Corporal Clyde Braswell both served in D Company (known as Dog Company) of the 81st. Their unit had been organized at Fort D.A. Russell, Texas, in 1942 and had been training for two years for the invasion of mainland Europe. In the weeks leading to the expected date of invasion, the battalion engaged in briefings; issued necessary equipment, rations, and ammunition; and waterproofed their vehicles and mortars. In addition, they participated in numerous amphibious assault rehearsals.

On 2 June, the men of the 81st were taken to the port of Dorchester, England, where they boarded the *USS Charles Carroll*, the transport that would take them into combat. For the next three days, the men

waited as foul weather battered the English Channel. They lay in clammy bunks, crowded into the oppressive confines of the hold, or checked and rechecked equipment while catching some fresher air up on deck.

Late in the afternoon of 5 June, the public address system came to life, issuing the recorded voice of General Dwight D. Eisenhower: "You are about to embark upon the great crusade," the loudspeakers announced, "toward which we have striven these many months. The eyes of the world are upon you…." As the speech continued, Captain Phil Gaffney, commander of D Company, turned to Lieutenant Frankel. "Dave, you take these papers with you," he said, handing the bundle to his subordinate. "I won't make it tomorrow." The act was unsettling, and Frankel could do little more than try to assure his captain that everything would go well the next day. "[I was] too busy to think a great deal about what would happen in the days ahead," recalled Frankel. "I was somewhat of a fatalist," he continued. "If I made it, I could only hope that I would not be maimed or severely injured. The thought of being killed instantly didn't bother me."

Corporal Clyde Braswell (left) and First Lieutenant Dave Frankel (right) survived the Omaha Beach landing and wrote about their experiences there.

The armada left port soon after sunset and steamed into the English Channel; at 2 o'clock the next morning, the men were roused for breakfast. The cooks, knowing this might be the last meal for many, pulled out all the stops. "It was a hellava [sic] breakfast," remarked Corporal Braswell, "only I lost it soon afterward." As the men finished their meal, the ship's galley and dining salon were cleared, and a large contingent of Navy doctors and corpsmen began to transform the space into emergency operating rooms. The men didn't have long to take in this foreboding sight, because orders were issued to report immediately to their respective landing craft for embarkation.

The assault force transferred from the large transport into the landing crafts, vehicle, personnel (LCVPs). Made by the Higgins Boat Industries, Incorporated, these small, wooden-hulled craft (also called Higgins boats) could carry a single mortar squad and their equipment. Once loaded, the craft circled in a rendezvous spot about three miles from shore, waiting for the signal to head in. The men of the 81st were attached to the 16th Infantry and 116th Regimental Combat Team—the Dragon Soldiers would be part of the second wave to land on Omaha Beach. "The old channel was plenty choppy," reported Braswell, "and pretty soon you noticed the other fellows' faces getting pale and a scrambling for vomit bags."

Through the gray light of dawn, the faint outline of the coast became discernable. Hundreds of shells and rockets began to strike the beach, searching for enemy pillboxes and creating a smoke screen to obscure the first wave from the German defenders. "It seemed like an eternity," said Braswell, "watching wave after wave of planes passing overhead and bobbing on wave after wave of water underneath."

Their landing crafts made for the beach at H Hour plus fifty minutes, when the situation at Omaha Beach was still very much in doubt. The LCVPs formed a line abreast and took the azimuth of their assigned landing area sectors: Easy Red and Dog Green. The sound of incoming shells now became audible over the noise of the craft's engine. Lieutenant Frankel looked over the side of the craft and remarked to his radioman that it didn't look too rough. "It became apparent to me that we were really going into combat. My three years of training would either pay off or come to a sudden stop," he later recalled.

Corporal Braswell, riding in a different Higgins boat, shared Frankel's curiosity. He raised his head over the gunnels to catch a quick glimpse of the approaching beach, noting that the obstacles and belts of barbed wire were just like the ones in the aerial photographs they had seen in briefings. "Suddenly it sounded like a riveter was at work…" he wrote. "We had never heard that noise before, but no one had to tell us that it was machine gun bullets pecking on our ramp."

When the ramp dropped, Lieutenant Frankel emerged into a world of choking smoke, flying shrapnel, and bursting machine gun fire. Jumping into chest-deep surf, he realized the water was no longer ocean blue, as it had been in the training assaults in

England. "The dead were everywhere," he reported, "and the water was red [with their blood]." He quickly took cover behind a submerged steel obstacle, as bullets and shrapnel ricocheted around him. One fragment struck Frankel in the face, slightly wounding him. He was, however, more concerned with the rising tide. "[It] was gaining on us faster than we were gaining ground," he recalled.

Corporal Braswell had just stepped off the ramp of his LCVP into neck-deep water when the adjacent LCVP grounded on a mined obstacle and exploded. A large piece of shrapnel struck his carbine, ripping it from his grasp. "I remember a flush of anger at that moment," wrote Braswell. "That was the gun I was issued at [Camp] Pickett, and I had kept it in good condition so long just to lose it on the pay run." Like Lieutenant Frankel, Braswell was forced by the heavy fire to take cover behind a tetrahedral beach obstacle. Crouching in the cold surf, he felt as if he was freezing. "I had never been so scared in my life as I was… on the beach," Braswell said. He could feel his chest constricting, and the sensation of being suffocated overcame him. It was not, however, the cold or his fear that produced the feeling. Instead, it was his lifebelt, which had been accidentally inflated. Braswell punctured the belt with his knife, relieving the pressure immediately. "I could hear machine gun bullets smacking into the discarded life belts all around me," he recalled, "and decided my position was not good, so I made a record-breaking dash for the protection of a little wall on the beach." After retrieving another carbine from a fallen soldier, he tried to contact Captain Gaffney by radio. His attempts were in vain. Captain Phil Gaffney had been in the adjacent LCVP and had been killed in the explosion.

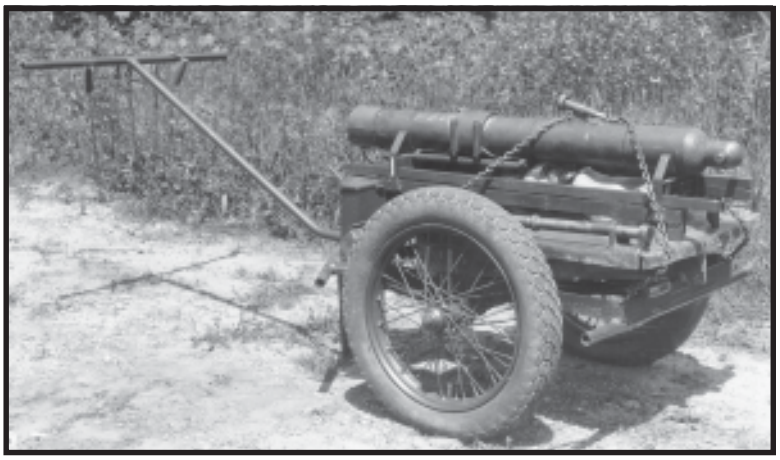
The other men of D Company were busy as well. Despite heavy casualties among the noncommissioned officer and officer cadre, the men performed their duties in an extraordinary manner. When heavy enemy fire, high surf, and the abundance of beach obstacles caused landing craft to discharge their cargo far from the beach, the men tied their own life belts to the mortar carts and swam their weapons ashore. This was certainly no easy task, as the carts weighed almost 500 pounds fully loaded.

When one cart sank after machine gun fire shredded the life belts attached to it, four D Company soldiers launched a determined effort to recover their weapons. Each man was repeatedly wounded as the group struggled against the tide, reattaching life belts to the cart and floating it ashore. All four men refused medical attention until they achieved their goal—getting their mortar ashore and into action against Hitler's "Fortress Europe."

Corporal Braswell wrote just days after the battle: "Everything is a little hazy to me. I can remember shells coming in on the beach, burning vehicles all around us, and trying to dig into the sand and gravel of the beach. It was so crowded that someone would throw a shovel full of sand in your hole every time you scooped one out."

When an amphibious truck or DUKW (pronounced *duck*) carrying ammunition was hit and exploded, a rain of falling ordnance pelted the beach. Braswell's second carbine was smashed, along with his radio, by a falling unexploded mortar shell. Undeterred, he armed himself with a German rifle and pressed the fight inland. Lieutenant Frankel, stumbling over the submerged body of an American soldier, led a portion of his company up the steep slope and routed German defenders from their positions overlooking the beach.

The mortarmen of the 81st provided the first direct-fire support on Omaha Beach that day and, indeed, fired the first American support missions on the European continent. In the two weeks of combat after D Day, this battalion alone fired more than seven thousand rounds of 4.2-inch high-explosive and white phosphorous shells in support of the Allied breakout. The combat initiation of the 81st had not come easily. Nearly two dozen men had fallen, most from A and D Companies. Casualties had been especially high among the officer cadre: more than a third had been killed or wounded, including the battalion commander, Lieutenant Colonel Thomas H. James. Writing to a friend, James proudly stated, "The men went in early, took their losses in a perfectly



The mortar cart, packed with the 4.2-inch chemical mortar components, weighed 491 pounds.

hellish situation, and distinguished themselves in their first action."

Uncommon valor was a common occurrence on 6 June 1944. For their actions to retrieve their submerged mortar cart, Sergeant Raymond Nicoli, Technician 5 Felice Savino, Private Donald McLaren, and Private Benton Porter received the Distinguished Service Cross. Private Kenneth Kidwell, a member of the battalion medical detachment, also received this award. Seeing a group of wounded men struggling in the surf, Kidwell— fearing they would either be hit again or drown as they were swept to sea—repeatedly ran through a gauntlet of intense enemy fire to rescue them. Wounded, Private Kidwell gave these men first aid with complete disregard for his own safety.

Men of Dog Company pose with a captured Nazi flag, Germany, 1945.

First Lieutenant James Panas, executive officer of A Company, received this decoration for his gallant leadership. After rescuing a wounded soldier struggling in the surf, Panas watched as his company commander was repeatedly hit by machine gun fire. Running through the beaten path, he reached the mortally wounded man and carried him ashore. After administering what medical aid he could, Lieutenant Panas took command of the company, leading them off the beach and into firing positions on the bluff above.

The men of the 81st had not only lived up to their motto, "Equal to the Task," but also surpassed it. "We who landed on Omaha did not feel we were heroes," explained Lieutenant Frankel. "… We were fighting for freedom and to make the world safe for democracy. I think most of my men felt that we had a job to do and 'let's get it behind us,' otherwise, the way of life that we knew and loved would be lost."

In the Norman town of Vierville-sur-Mer, France, a bronze plaque decorates the wall of the village church. Half a world away, this plaque joins a large stone monument at Fort Leonard Wood, Missouri, as physical memorials to the service of the 81st Chemical Battalion (Motorized). The story of the 81st is one worth telling and is one that demands to be preserved. These Dragon Soldiers exemplify the proud tradition of the Chemical Corps, and their values of sterling service, selfless sacrifice, and dedication to duty are timeless. By remembering these qualities, we are forced to uphold them, take them as our own, and strive toward excellence. Perhaps this is the greatest memorial of all.[2]

Endnotes

[1]The battalion's name changed from the 81st Chemical Battalion to the 81st Chemical Battalion (Motorized) on 25 April 1942. It was then redesignated as the 81st Chemical Mortar Battalion on 22 February 1945.

[2]The Frankel, Braswell, Christiansen, and Gibbs groupings (1941 to 1945) of the 81st Chemical Battalion (Motorized) collection, found in the U.S. Army Chemical School historical archives, Fort Leonard Wood, Missouri, are the sources of this article.

Mr. Lindberg is the military archivist of the U.S. Army Chemical School at Fort Leonard Wood, Missouri. He was the archivist at the Lincoln Home National Historic Site and was an Opposing Force simulation specialist with the Battle Command Training Program at Fort Leavenworth, Kansas. He graduated from Drury University, Springfield, Missouri.

Soldier Safety

Wearing Synthetic Fiber Underwear Under the Nomex CVC Uniform

By Mr. Larry T. Hasty

A question that surfaces frequently among combat vehicle crewmen (CVC) is whether it is safe to wear underwear made with synthetic fibers such as polypropylene or polyester under the Nomex® CVC uniform. The answer is no—it can be a safety hazard in a fire.

This includes the new moisture-wicking T-shirt the Army is fielding. Nylon melts at about 480 degrees Fahrenheit, and other synthetics melt at 300 degrees Fahrenheit. Heat transfer through Nomex, which resists temperatures up to 700 degrees Fahrenheit, could be high enough to melt these synthetic undergarments.

An Army chief warrant officer was quoted in the February 1995 issue of *Flightfax*, an Army aviation risk management publication, regarding his experience when his aircraft caught fire highlights this safety issue. "My chest, back, and buttocks were spared from any burns at all due to the cotton underwear that I had on. The burn literally went to where the underwear was and stopped. If I hadn't been wearing my Nomex protective equipment and wearing it properly, there is no doubt in my mind that I would very probably have either died in the fire or died as a result of the burns I would have received."

For protection, either wear underwear made of 50 percent cotton and 50 percent wool or of 100 percent cotton. These natural fibers won't melt and will provide protection that will keep the heat away from your body in a flash fire. Recommended items and their national stock numbers (NSNs) are shown in the table.

Keep the Nomex CVC uniform clean. Oil, grease, or household starch will cause the fabric to burn. Dry cleaning or laundering to remove these contaminants will restore the uniform's fire retardant properties.

Don't be the soldier who survives a vehicle fire only to find yourself with melted polypropylene stuck to your skin. Worn properly, the CVC uniform will protect you from burns should the unexpected happen in your combat vehicle. For more information on this subject or other CVC clothing and individual equipment, contact the Assistant TRADOC Systems Manager-Soldier at Fort Knox, Kentucky: Lieutenant Colonel Craig Carson, at (502) 624-3519, DSN 464-3519 or e-mail <*craig.carson@knox.army.mil*>; or Mr. Larry T. Hasty at (502) 624-3662, DSN 464-3662, or e-mail <*larry.hasty@knox.army.mil*>.

NSNs for Recommended Items

Drawers, 100% cotton, cold weather

8415-01-051-1175 X-Small
8415-00-782-3226 Small
8415-00-782-3227 Medium
8415-00-782-3228 Large
8415-00-782-3229 X-Large

Undershirt, 100% cotton, cold weather

8415-01-051-1174 X-Small
8415-00-270-2012 Small
8415-00-270-2013 Medium
8415-00-270-2014 Large
8415-00-270-2015 X-Large

Undershirt, flyers, man, Aramid

8415-01-043-8375 X-Small
8415-00-485-6547 Small
8415-00-485-6548 Medium
8415-00-485-6680 Large
8415-00-485-6681 X-Large

Drawers, flyers, Aramid

8415-01-043-4036 X-Small
8415-00-467-4075 Small
8415-00-467-4076 Medium
8415-00-467-4078 Large
8415-00-467-4100 X-Large

Gloves, flyers, summer

8415014828417 Size 4
8415010402012 Size 5
8415010401453 Size 6
8415010290109 Size 7
8415010290111 Size 8
8415010290112 Size 9
8415010290113 Size 10
8415010290116 Size 11
8415014828420 Size 12

Gloves, mounted crewman, intermediate, cold weather

8415014469247 Size 5
8415014469248 Size 6
8415014469252 Size 7
8415014469253 Size 8
8415014469254 Size 9
8415014469256 Size 10
8415014469259 Size 11

Mr. Hasty is the deputy and senior technical advisor to the Assistant TRADOC Systems Manager-Soldier at the U.S. Army Armor Center, Fort Knox, Kentucky.

Book Reviews

By Mr. Reid Kirby

Chemical Demilitarization: Public Policy Aspects, Al Mauroni, Praeger Pulishers, April 2003.

The U.S. Army has a long history in chemical demilitarization, dating back to the activities of the Chemical Warfare Service in World War I. Though the practices have changed over the decades, they were always in keeping with the practices of industry at the time.

Al Mauroni's discourse on chemical demilitarization is limited to the U.S. Army Chemical Corps's experience with incineration (from the 1970s to the present). His main focus is on how a straightforward endeavor ended up as a hotly debated $24-billion, 25-year project and ultimately what lessons chemical soldiers may gain from this experience.

The book is replete with references to public laws and is one of the most detailed accounts of U.S. chemical-demilitarization activities. Mr. Mauroni sees the evolution of the demilitarization program as three distinct bands: Army-funded to destroy "leakers," Department of Defense (DOD)-funded to destroy obsolete chemical weapons to make room for binary weapons, and the current program to destroy all chemical weapons to meet U.S. disarmament treaty obligations.

His accounts are highly detailed and show a program embroiled with political conflicts. It is also a testament to the responsiveness of the U.S. Army to communities and groups. His analysis is critical of the political machinery at work on national projects and the inability of the Chemical Corps to affect public policy.

The book concludes that the policy lessons from the chemical demilitarization program are educational to other chemical- and biological-related issues (such as the anthrax vaccination program). A cultural change within the Army and greater teamwork within DOD is recommended.

Chemical Demilitarization is a valuable historical study and a must-read reference on the subject. It is also invaluable for understanding public-policy processes that affect the Chemical Corps.

Chemical and Biological Warfare: A Reference Handbook, Al Mauroni, ABC-CLIO, July 2003.

The *Contemporary World Issues* series of textbooks is intended for high school and college undergraduate studies. This particular title addresses the issues of chemical and biological warfare (CBW) in a format suitable as a special topic in a social studies or a political science course.

It is a balanced work that provides easy-to-read information on CBW policies through historical introspection. As a textbook designed specifically for supporting a teaching plan, the book sets the context through topical presentations of issues and controversies, leads into the chronology and basic background of CBW, and ends with case studies and resources to facilitate classroom discussion and student research. Educators will find this a highly usable book to support a semester study on CBW. The listed references serve as a guide to additional reading, and the list of organizations and Internet resources serve well for in-depth report writing.

The style of writing is clear, concise, and focused on high-level discussions without the distraction of technical details too common with many books addressing CBW. Rather, the book relies on references and resources for the student to learn the more in-depth technical aspects of CBW. The selection of topics is uniquely U.S. centric but also covers global issues. Though the chronology starts with some of the earliest history of CBW, much of the text relates to Cold War and present-day issues.

Chemical soldiers will value this book as a resource for communicating CBW-related issues. The annotated resources in the book represent material that all chemical soldiers should be familiar with, but they also serve as a self-study guide for public information on CBW (such as suggested reading).

Mr. Kirby is a subject matter expert who consults for the U.S. Army Chemical Corps Museum and the History Office, both located at Fort Leonard Wood, Missouri.

CML, Army Chemical Review Writers' Guide

CML, Army Chemical Review is a professional-development bulletin designed to provide a forum for exchanging information and ideas within the Army nuclear, biological, and chemical (NBC) community. We include articles by and about officers, enlisted soldiers, warrant officers, Department of the Army civilian employees, and others. Writers may discuss training, current operations and exercises, doctrine, equipment, history, personal viewpoints, or other areas of general interest to chemical soldiers. Articles may share good ideas and lessons learned or explore better ways of doing things.

Articles should be concise, straightforward, and in the active voice. If they contain attributable information or quotations not referenced in the text, provide appropriate endnotes. Text length should not exceed 2,000 words (about eight double-spaced pages). Shorter after-action-type articles and reviews of books on NBC topics are also welcome.

Include photos (with captions) and/or line diagrams that illustrate information in the article. Please do not include illustrations or photos in the text; instead, send each of them as a separate file. Do not embed photos in PowerPoint® or Microsoft® Word. If illustrations are in PowerPoint, avoid excessive use of color and shading. Save digital images at a resolution no lower than 200 dpi. Images copied from a Web site must be accompanied by copyright permission.

Provide a short paragraph that summarizes the content of the article. Also include a short biography, including your full name, rank, current unit, and job title; a list of your past assignments, experience, and education; your mailing address; and a fax number and commercial daytime telephone number.

Articles submitted to *CML, Army Chemical Review* must be accompanied by a written release by the author's unit or activity security manager prior to publication. All information contained in the article must be unclassified, nonsensitive, and releasable to the public. *CML, Army Chemical Review* is distributed to military units worldwide and is also available for sale by the Government Printing Office. As such, it is readily accessible to nongovernment or foreign individuals and organizations.

We cannot guarantee that we will publish all submitted articles. They are accepted for publication only after thorough review. If we plan to use your article in an upcoming issue, we will notify you. Therefore, it is important to keep us informed of changes in your e-mail address or telephone number. All articles accepted for publication are subject to grammatical and structural changes as well as editing for style.

Send submissions by e-mail to <*ATSNCM@wood.army.mil*> or send a 3 1/2-inch disk in Microsoft® Word, along with a double-spaced copy of the manuscript, to—

CML, Army Chemical Review
320 MANSCEN Loop, Suite 210
Fort Leonard Wood, Missouri 65473-8929.

Subcribe to *CML*, Army Chemical Review

New Subscriptions: Use the subscription form below. Cost for a subscription is $12.00 (domestic and APO/FPO) or $16.80 (foreign).

Renewal Subscription: To keep subscription prices down, the Government Printing Office mails each subscriber only one renewal notice. To be sure that your service continues without interruption, please return your notice promptly. If your subscription service is discontinued, simply send your mailing label from any issue to the Superintendent of Documents, ATTN: Mail List Branch, Mail Stop: SSOM, Washington, D.C. 20402, with the proper remittance, and your service will be reinstated.

Address Changes: Please send your mailing label, along with your new address, to the Superintendent of Documents, ATTN: Mail List Branch, Mail Stop: SSOM, Washington, D.C. 20402.

Inquiries About Subscription Service: Please send your mailing label, along with your correspondence, to Superintendent of Documents, ATTN: Mail List Branch, Mail Stop: SSOM, Washington, D.C. 20402. Telephone number (202) 512-1800.

Subscription Order Form

United States Government
INFORMATION

Order Processing Code:
*5907

Credit card orders are welcome!
Fax your orders (202) 512-2250
Phone your orders (202) 512-1800

☐ YES, please send_____subscriptions to:
CML, Army Chemical Review at $12 each ($16.80 foreign) per year.

The total cost of my order is $_____. Price includes regular shipping and handling and is subject to change.

Name or title (Please type or print)

Company name Room, floor, suite

Street address

City State Zip code+4

Daytime phone including area code

Purchase order number (optional)

Check method of payment:
☐ Check payable to: Superintendent of Documents
☐ GPO Deposit Account ☐☐☐☐☐☐☐–☐
☐ VISA ☐ Mastercard ☐ Discover

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐
(expiration date)
☐☐☐☐

Authorizing signature

Thank you for your order!

Mail to: Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954
Important: Please include this completed order form with your remittance.

Quality Assurance Feedback Program

Much like the pace at which we entered Baghdad during Operation Iraqi Freedom, the pace at which we transform the training of our soldiers to meet the Army's needs in the contemporary operational environment (COE) must be swift and deliberate.

As our nation continues the Global War on Terrorism, we must train the "critical" tasks required for success on the battlefield. Since the conditions will vary with each operation, our soldiers must receive training on a wide variety of tasks to function in the COE and accomplish the mission. Existing tasks may need to be revised, new tasks may need to be developed, and doctrinal changes may be warranted. Your feedback, as a member of the Chemical Corps, is needed.

To obtain ideas, concerns, and comments, the U.S. Army Chemical School has established the Quality Assurance Feedback Program to solicit feedback from graduates and their supervisors. The program will help ensure that the tasks trained in the school are current and that soldiers feel confident they can perform the tasks upon graduation. We need frank and honest feedback to determine if modifications to the training base are needed.

To address these concerns, the following e-mail address has been established: <*atztqaocm@wood.army.mil*>. There are two ways that soldiers can assist the Chemical Corps: First, they can use this address at any time to submit concerns and provide feedback on training. Second, upon graduation from a resident course, they will be given a letter to present to their supervisor. This letter will request that each supervisor send an e-mail to the above address and provide the soldier's name, course name and class number, and graduation date. Six to twelve months following graduation, soldiers will be sent surveys to address concerns and/or comment on the training provided at the Chemical School. The graduate's supervisor will also receive notification to respond to a survey requesting feedback on the soldier's performance following training. Recommendations to change course curricula will then be forwarded to the commandant of the Chemical School.

Additionally, as veterans return from the Balkans, Operation Enduring Freedom, and Operation Iraqi Freedom, we will seek to collect their feedback as well. All comments and concerns should be sent to the Quality Assurance Office/Quality Assurance Element at the e-mail address shown above.

PIN 081135-000